AFMC

Integrated Master Plan/ Integrated Master Schedule (IMP/IMS) Training Course

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Who Are We?

- **Presenters**
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- **Sponsor**
  - **Steve Clark, HQ AFMC/AE**
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Why Are We Here?

- **Previously multiple guides for IMP/IMS throughout Command/DoD**
  - **Inconsistent in content and/or application**
  - **Created confusion within Industry**
- **Decision to create one AFMC guide**
  - **Consistent philosophy/approach**
  - **Tailorable for each program/project**
  - **Improve learning curve on IMP/IMS for both program/project office and Industry**
  - **Help create improved IMP/IMS products reflecting a systems approach**
- **Provide "cadre" training on guide and its application**

Guide site: ***http://www.afmc-pub.wpafb.af.mil/HQ-AFMC/AE/docs/IMP-IMSGu***

IMP/IMS Guide and Training Program

- **Phase I**
  - **Develop consolidated AFMC IMP/IMS guide**
    - **Conducted workshop with center representatives to reach general consensus on approach and issues**
  - **Develop and present IMP/IMS training course to product and logistics centers**

- **Phase II**
  - **Develop and deliver e-learning course**

Course Outline

- **Learning Objectives**
- **IMP/IMS General Description**
- **IMP/IMS Development and Implementation**
- **Getting Help**

Course Outline

- Learning Objectives
- General Description
  - Overview
  - Integrated Master Plan
  - Integrated Master Schedule
  - Single Numbering System
  - Applications
  - Contractual Relationships
  - IPPD Compatibility

Course Outline

- Development and Implementation
  - Development
    - Government Roadmap IMP/IMS
    - Pre-Award IMP/IMS
    - RFP Guidance
    - Execution IMP/IMS
    - Evolutionary Acquisition
  - Implementation and Execution
    - Pre-Contract Award
    - Post-Contract Award
- Getting Help

Course Outline

- **Learning Objectives**
- **IMP/IMS General Description**
- **IMP/IMS Development and Implementation**
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Learning Objectives

- **Understand AFMC IMP/IMS Guide**
  - **Define IMP/IMS concept and process**
  - **Define terminology**
  - **Define applications of the IMP/IMS**
  - **Describe the elements of an IMP and IMS**
  - **Describe how to relate IMP/IMS to other documents (e.g., WBS, SOW)**
  - **Define IMP/IMS contractual aspect**

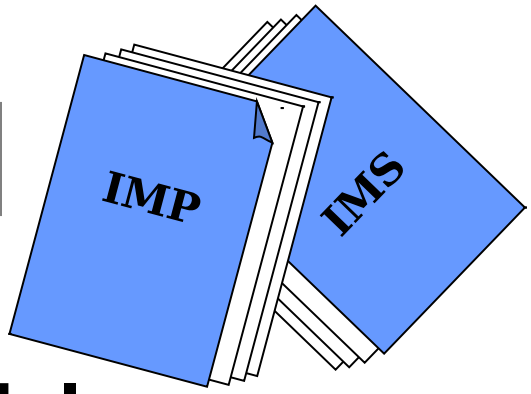
Learning Objectives

- **Understand how to apply IMP/IMS Guide**
  - **Preparing RFP guidance for IMP/IMS preparation**
  - **Building an IMP and an IMS**
  - **Implementing the IMP and IMS**
  - **Using the IMS for program tracking/analysis**
  - **Maintaining change control**
  - **Getting help with IMP/IMS**

Course Outline

- Learning Objectives
- **IMP/IMS General Description**
- IMP/IMS Development and Implementation
- Getting Help

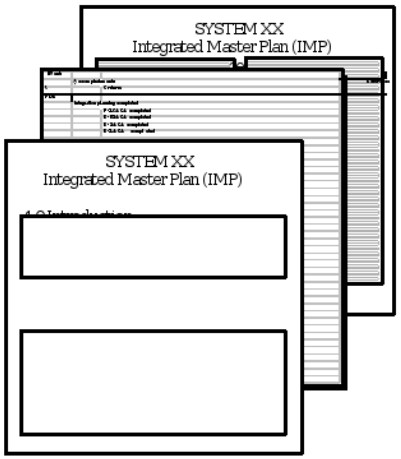
General Description

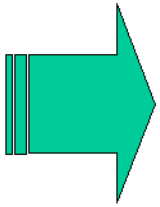


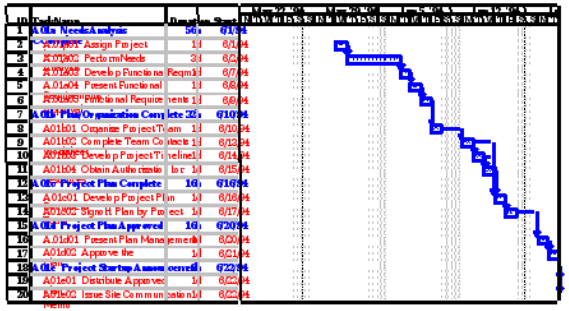
- **Overview/Why IMP/IMS?**
- **Integrated Master Plan**
- **Integrated Master Schedule**
- **Single Numbering System**
- **Applications**
- **Contractual Relationships**
- **IPPD Compatibility**

IMP & IMS Overview

Important Characteristics







Integrated Master Plan (IMP)

- *Event based plan*
- *Contractual document*
- *Relatively top level*

Integrated Master Schedule (IMS)

- *Task & calendar based schedule*
- *Level of detail necessary for day -to -day execution*

Consistent with contractor's management and scheduling system structure and format

Why IMP/IMS?

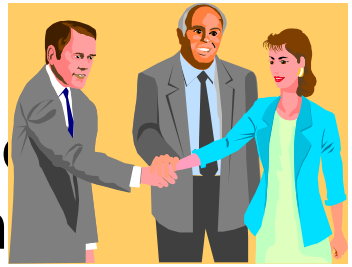
It's Smart Business!

- **Enhances management of AFMC's acquisition and sustainment programs**
  - **Systematic approach to program planning, scheduling, and execution**
  - **Applies to competitive and sole source acquisitions as well as government-only in-house efforts**
  - **Tool for improved day-to-day program execution**
  - **Improves program/project insight**
  - **Supports budgeting, "what-ifs", and work-arounds**
  - **Strengthens government/contractor team**

Why IMP/IMS?---Benefits

- Offeror/contractor flexibility in detailed program plan, organization, and execution within RFP/contract constraints
- Emphasis on <u>real</u> integrated product development and systems integration
  - All functional disciplines represented
  - Networked tasks and relationships
- Government evaluator's information to help assess offeror's approach against the Mission Capability, Proposal Risk, Performance Confidence, and Price/Cost evaluation factors
  - Executable within cost/schedule/risk constraints

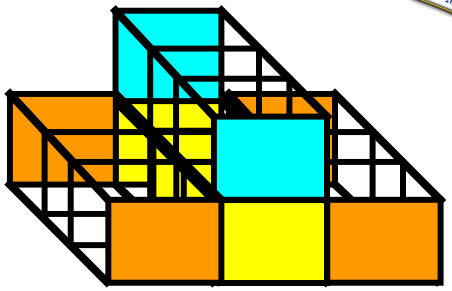
Why IMP/IMS?---Benefits



- **Basis for mutual understanding/agre on program content, plan, sch and risk**

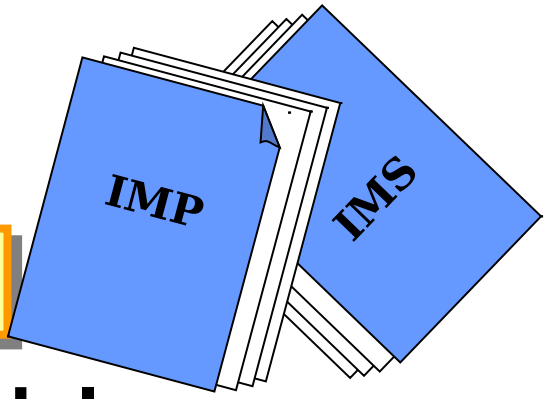
- **Tool for contractor's day-to-day program execution**
  - **Detailed integrated execution plan and supporting schedule**
    - **<u>What</u> has to be done**
    - **<u>When</u> it must be done**

Why IMP/IMS?---Benefits



- **Framework for insight into contractor's performance**
  - **Identify and assess actual progress vs. plan**
  - **Monitor critical path, develop work-arounds**
  - **Assess program maturity**
  - **Assess risk management status**
    - **Mitigation activities should be included in the IMP/IMS**
  - **Supports objective, quantitative basis for Contractor Performance Assessment Rating (CPAR) and Award Fee**

General Description



- Overview/Why IMP/IMS?
- **Integrated Master Plan**
- Integrated Master Schedule
- Single Numbering System
- Applications
- Contractual Relationships
- IPPD Compatibility

Integrated Master Plan (IMP)

- ***What is an IMP?***
- ***What are events, accomplishments, and criteria?***
- ***The way the IMP works***
- ***What are IMP narratives?***

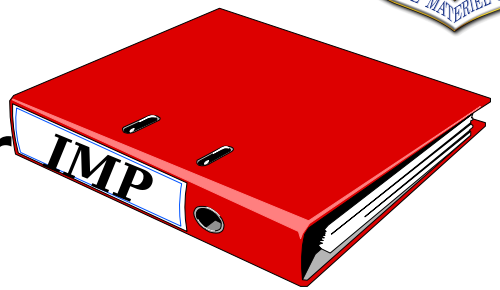
What is an IMP?--- Definition

Integrated Master Plan (IMP)

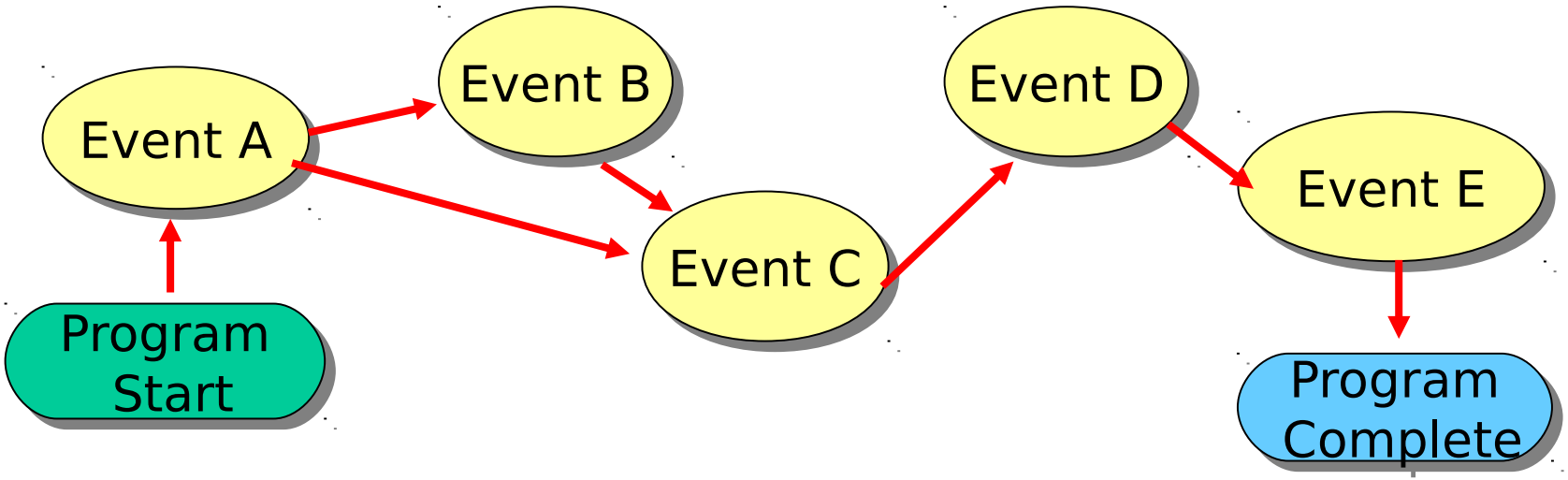
- **An event-driven program/project plan that provides:**
  - **Top-level control and progress management**
  - **Through establishment of key events and associated accomplishments, as well as accomplishment criteria**

Activity #	Event Accomplishment Criteria	WBS REF
A	**Post Award Conference (PAC)**	**-**
A01	Integrated Product Teams (IPTs) Fully Staffed and Chartered	-
A01a	IPT Contractor/Govt Members Identified	12120
A01b	IPT Charters Approved	12500
A02	Management Processes and Tools Implemented	-
A02a	Sys Engr/Program Mgt Processes/Tools in Place (IMP, Config, Quality)	12120, 12150, 12200
A02b	Business Mgt Processes/Tools (EVMS, WBS, Subcontract Mgt) in place	12120

What is an IMP?



- **An <u>event</u>-driven plan for executing the program**



- **<u>Not</u> a calendar based plan**
- **Becomes a <u>contractual</u> document**

What is an IMP?

- **Tool to plan work and assess progress**
  - **Contains**
    - **Introduction**
    - **Hierarchy of the program execution activities**
      - ***Events* laid out sequentially**
        - ***Accomplishments* supporting each event**
          - ***Criteria* supporting each accomplishment**
    - **Optional narratives on critical processes and on level-of-effort tasks not normally found in IMP**
    - **Glossary of terms**
  - **Reflects IPPD approach for disciplines and products**

What are Events?--- Definition

- **Event**

  A program assessment point which occurs at the culmination of significant program activities (Accomplishments/Criteria).

Task Name	
Widget Program	
Event A - Post Award Conference	(PAC)
Event B - Final Design Review	(FDR)
Event C - First Flight Complete	(FFC)
Event D - Functional/Physical Configuration Audit	(FCA/PCA)
Event E - Initial Widget Production Complete	(IPC)

What are Events?

First Flight!

- **Logically sequenced points to assess program progress**
  - **DoD reviews (e.g., Milestone A)**
  - **Program reviews (e.g., design, production readiness, and supportability reviews)**
  - **Tests, deliveries, and other key progress demonstration or risk mitigation points**

Events are the foundation of the plan

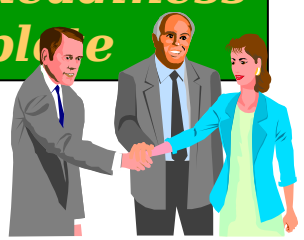
The Way the IMP Works!

Event

Event readiness or compl
provides a measure of pro

First Flight!

What are Accomplishments? --- Definition



- **Accomplishment(s)**
  The desired result(s) prior to or at completion of an event that indicates a level of the program's progress

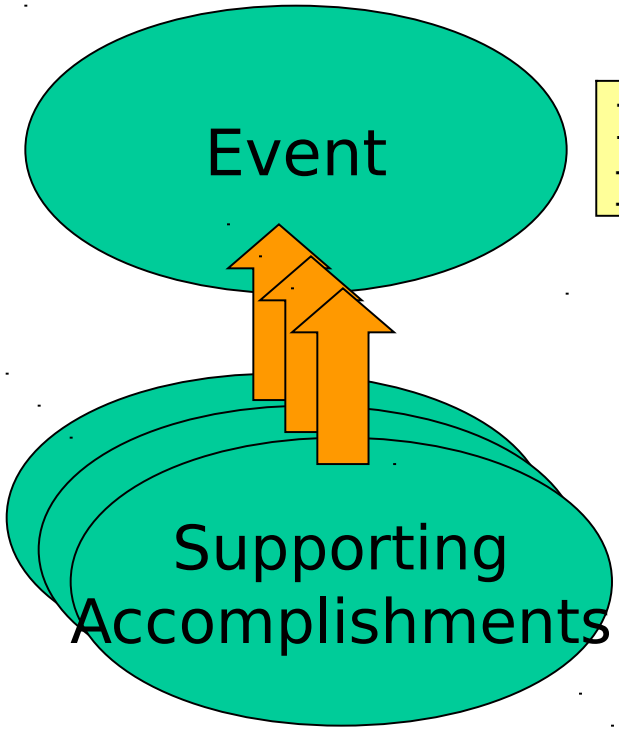
Activity #	Event Accomplishment Criteria	WBS REF
D	**First Flight Complete**	-
D01	First Flight Readiness Review Complete	-
D01a	Test Planning Complete	13400
D01b	SEEK EAGLE Flight Clearance Obtained	13400
D01c	Test Assets In Place	11100, 13400
D02	First Flight Test Complete	-
D02a	Ground Tests Conducted	13400
D02b	First Flight Conducted	13400

What are Accomplishments?

- Activities or steps whose completion indicates progress toward starting or completing an event

- Might include
  - Deliveries of systems/subsystems
  - Completion of integration activities
  - Completion of readiness reviews

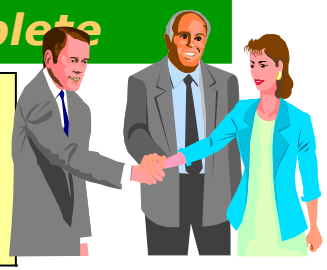
The Way the IMP Works!



Event readiness or completion provides a measure of progress

First Flight Readiness Review Complete

Usually there are multiple supporting accomplishments for each event



What are Criteria?--- Definition

- ***SEEK EAGLE Flight Clearance Obtained***

- **Criteria**

  Criteria provide definitive evidence that a specific accomplishment has been completed

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D02	First Flight Test Complete	-
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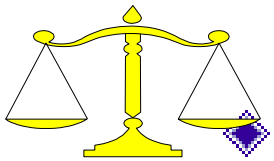
What are Criteria?

- **Definitive measures/indicators that verify accomplishment completion**
  - **Completed work effort**
    - **e.g., Manufacturing Plan <u>Completed</u>**
  - **Confirmation of performance compliance**
    - **e.g., Flight Test Report <u>Approved</u>**
  - **Results of incremental verification**
    - **e.g., Maintenance Demonstration <u>Completed</u>**
  - **Completed critical process activities**
    - **e.g., Risk Management Plan <u>Approved</u>**



“Software 90% complete”---doesn’t hack it!

What are Criteria?

- **May use “entry” or “exit” criteria for certain accomplishments that support <u>resource intensive</u> events, e.g., major reviews**
  - **Entry Criteria: Substantiates <u>readiness</u> for the review; prevents costly “false starts”**
  - **Exit Criteria: Substantiates successful <u>completion</u> of the review**

Ready?

Done?

CDR---Are they ready? Did they succeed?

The Way the IMP Works!

Event

Supporting Accomplishments

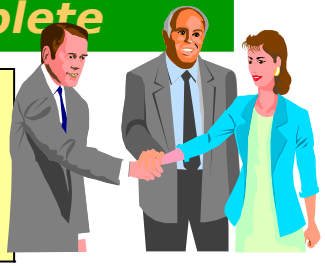
Supporting Criteria

Event readiness or completion provides a measure of progress

First

First Flight Readiness Review Complete

Usually there are multiple supporting accomplishments for each event



•SEEK EAGLE Flight Clearance Granted

Usually there are multiple supporting criteria for each accomplishment

What are IMP ratives?

- **Optional** IMP section(s) used to enhance understanding
  - Task Narratives
    - Explain level-of-effort tasks with no specific IMP accomplishments (e.g., configuration management, program control)
  - Process Narratives
    - Commit to use of selected proposed processes
    - Improve evaluator's understanding of proposed critical processes/procedures

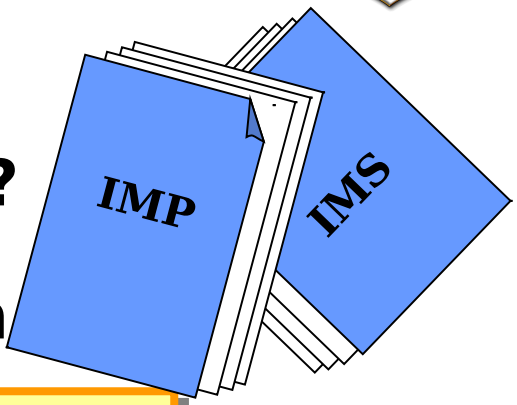
Remember: IMP is contractual, so narratives are too!

IMP Process Narratives

- **Pros**
  - Contractual commitment to process use
  - Additional insight into critical processes

- **Cons**
  - Can significantly increase IMP size
  - IMP is contractual; process changes may require contract change
    - Decreases contractor's flexibility to make internal process changes
    - Can inhibit continual process improvement

General Description



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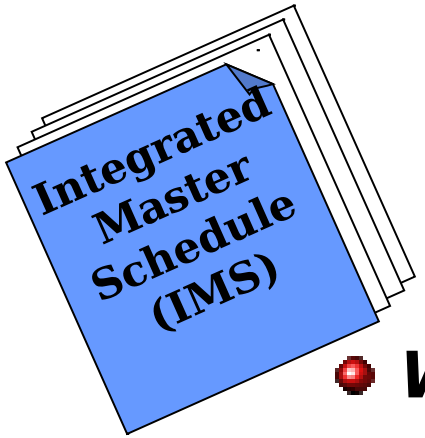
Integrated Master Schedule (IMS)

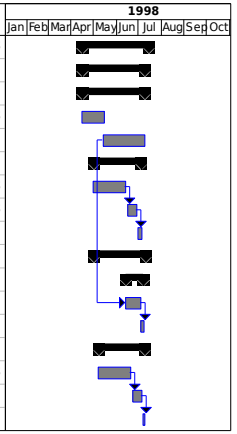


- *What is an IMS?*
- *What are tasks?*
- *What is the critical path?*
- *The way the IMS works*

What is an IMS?---Definition

- **Integrated Master Schedule (IMS)**
  An integrated, master schedule containing the networked, detailed *tasks* necessary to support the events, accomplishments, and criteria of the IMP

Activity#	Task Name	Start	Finish
B	Event B - Final Design Review	4/15/98	7/13/98
B01	Design definition complete	4/15/98	7/7/98
B01a	Design deltas to baseline Identified	4/15/98	7/7/98
B01a01-1.3.1	Perform requirements analysis	4/15/98	5/14/98
B01a02-1.3.1	Perform engineering design for deltas	5/13/98	7/7/98
B01b	Drawings Complete (baseline & deltas)	4/29/98	7/3/98
B01b01-1.1.1	Preparation of source control and manufacturing drawi	4/29/98	6/12/98
B01b02-1.1.1	Review by Engineering Manager	6/15/98	6/26/98
B01b03-1.2.1	Review by Program Manager	6/29/98	7/3/98
B02	System performance assessment Reviewed	4/29/98	7/9/98
B02a	Initial Weight Analysis Complete	6/12/98	7/6/98
B02a01-1.3.1	Perform calculations and analysis	6/12/98	7/2/98
B02a02-1.3.1	Internal review	7/3/98	7/6/98
B02b	Electrical Current Consumption Report complete	5/6/98	7/7/98
B02b01-1.3.1	Identify electrical equipment	5/6/98	6/19/98
B02b02-1.3.1	Calculate electrical current consumption	6/22/98	7/3/98
B02b03-1.3.1	Internal review	7/6/98	7/7/98



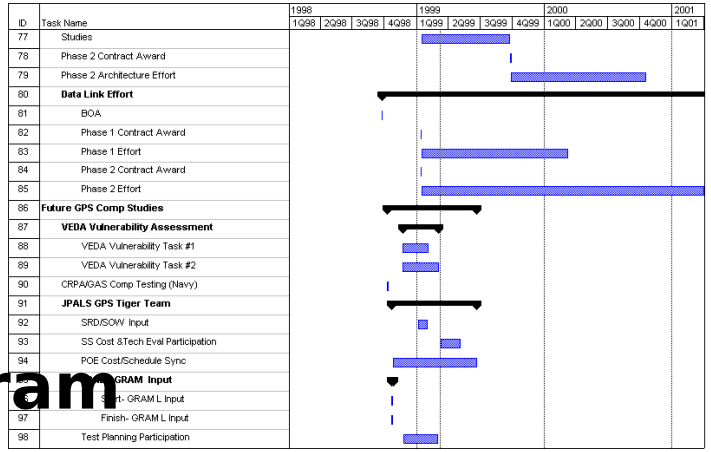
What is an IMS?

- **Integrated, networked schedule of tasks that support the IMP activities**
  - **Flows from, and traceable to, IMP's events, accomplishments, and criteria structure**
  - **Provides program critical path**
- **Created using automated scheduling tool**
  - **MS Project most commonly used**
- **Must be updated regularly**

What is an IMS?

- Initially exists in two formats
  - Electronic file generated by automated tool
  - Hard-copy document used for source selection evaluation
  - Both normally submitted with proposal
- Hard-copy document contains (typically)
  - Introduction
  - Networked events, accomplishments, criteria and tasks (Gantt or tabular)
  - Schedule rationale
  - Critical path and schedule risk analysis
  - Glossary of terms

What is an IMS? Key Points



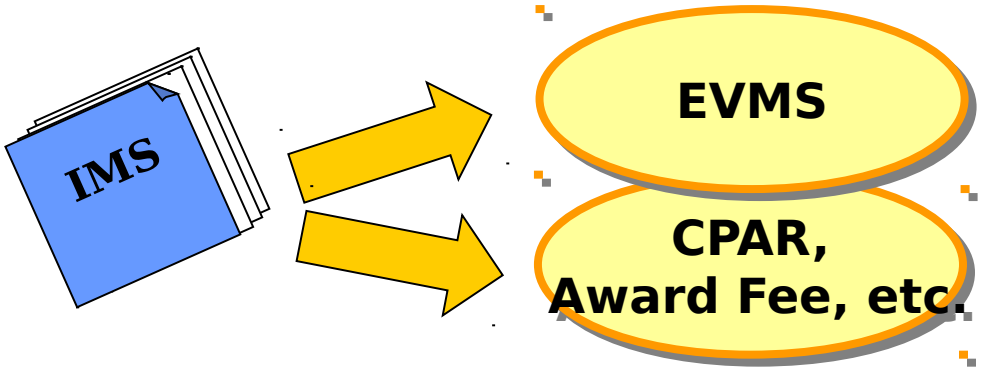
ID	Task Name	1998				1999				2000				2001
		1Q98	2Q98	3Q98	4Q98	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00	1Q01
77	Studies													
78	Phase 2 Contract Award													
79	Phase 2 Architecture Effort													
80	**Data Link Effort**													
81	BOA													
82	Phase 1 Contract Award													
83	Phase 1 Effort													
84	Phase 2 Contract Award													
85	Phase 2 Effort													
86	**Future GPS Comp Studies**													
87	**VEDA Vulnerability Assessment**													
88	VEDA Vulnerability Task #1													
89	VEDA Vulnerability Task #2													
90	CRPA/GAS Comp Testing (Navy)													
91	**JPALS GPS Tiger Team**													
92	SRD/SOW Input													
93	SS Cost &Tech Eval Participation													
94	POE Cost/Schedule Sync													
95	**GRAM Input**													
96	Finish- GRAM L Input													
97	Finish- GRAM L Input													
98	Test Planning Participation													

- **<u>Task</u>- driven schedule for executing the program**
- **<u>Tied to calendar</u> through start date, task durations, and task relationships**
- **IMS <u>should not</u> be put on contract**

What is an IMS? Uses

- **Used to execute day-to-day activities, assess progress, identify problems, assess work-arounds, define priorities**

- **Key input to performance measurement and assessing scope and duration of remaining work**



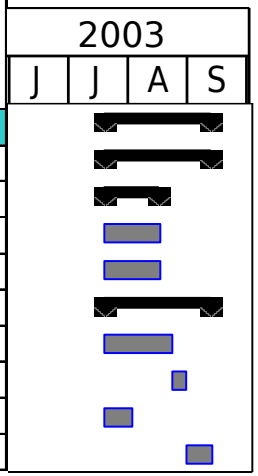
What are Tasks? -- Definition

- ***Perform SOF Analyses***
- ***Prepare & Submit SEEK EAGLE Certification Data***
- ***Validate S/W & H/W Interface in SIL***
- ***SEEK EAGLE provide interim flight clearance***

- **Tasks**

Time phased, ere work is accomplished and funds are expended) required to support the IMP criteria and accomplishments

Activity #	Event Accomplishment Criteria Task
D	**First Flight Complete**
D01	First Flight Readiness Review Complete
D01a	Test Planning Complete
D01a01	Prepare and submit flight test plans and procedures
D01a02	Govt approve flight test plans and procedures
D01b	SEEK EAGLE Flight Clearance Obtained
D01b01	Perform SOF analyses and test
D01b02	Prepare and submit SEEK EAGLE certification data
D01b03	Validate S/W and H/W interface in SIL
D01b04	SEEK EAGLE provide interim flight clearance



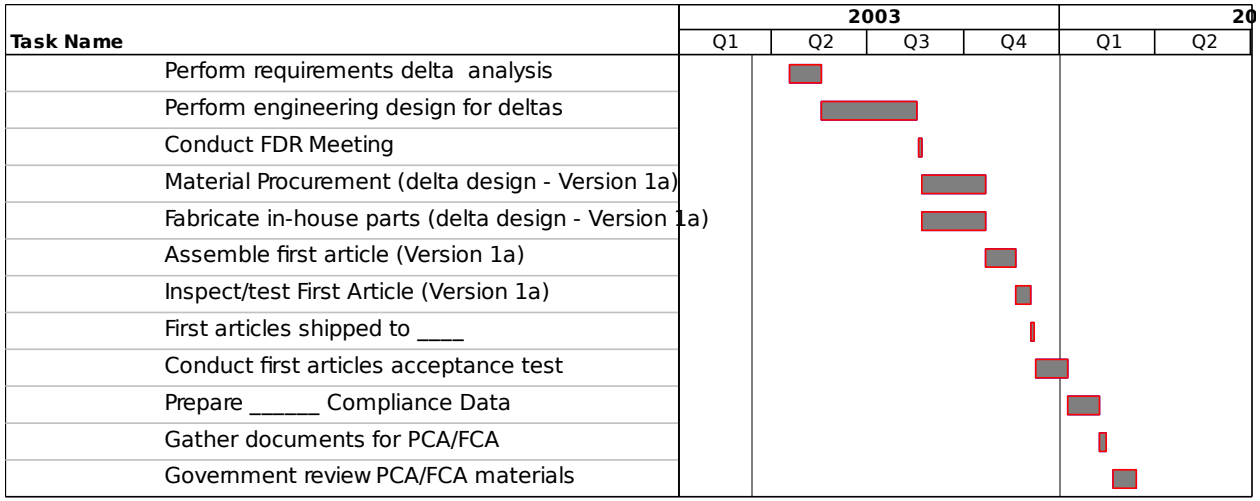
What are Tasks?

- **Time phased activities performed to satisfy the IMP criteria**
  - **Have a duration**
  - **Have relationships with other tasks within the network**
  - **<u>May</u> have start/finish constraints**

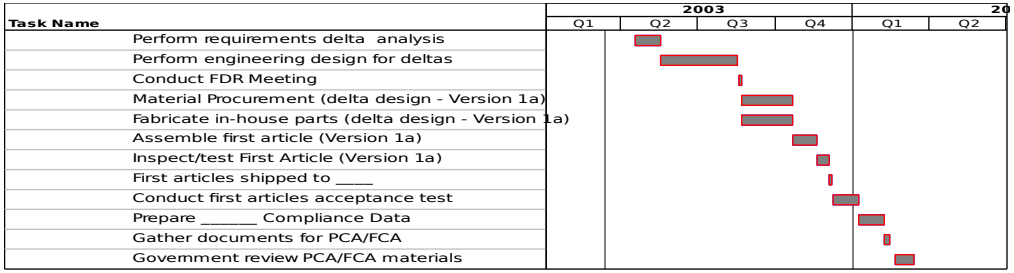
  - **Traceable to WBS, and thereby, to the SOW**

What is the Critical Path? --Definition

- **Critical Path**
  - **The sequence of activities (tasks) in the network that has the <u>longest total duration</u> through the program/project**



What is the Critical Path?



- **Activities along the critical path that have zero or negative slack/float time**
  - **If a critical path activity slips, program completion slips**
- **Critical path should be highlighted in report formats**

The Way the IMS Works!

Events

First Flight!

Accomplishments

First Flight Readiness Review Complete

Criteria

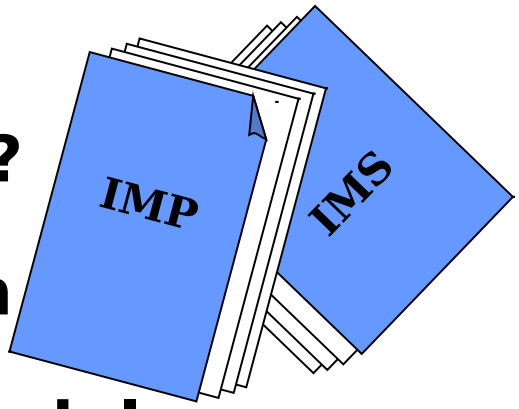
- ***SEEK EAGLE Flight Clearance Granted***

Tasks

- ***Perform SOF Analyses &***
- ***Prepare & Submit SEEK EAGLE Certification Data***
- ***Validate S/W & H/W Interface in SIL***
- ***SEEK EAGLE provide interim flight clearance***

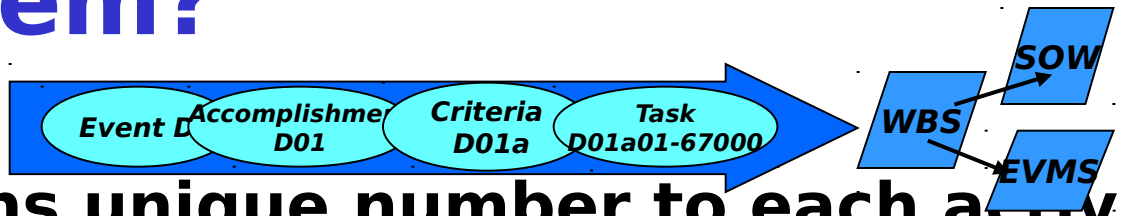
l IMP/IMS would
e
accomplishments supporting the First Flight event; each supported by multiple criteria with multiple tasks.

General Description



- Overview/Why IMP/IMS?
- Integrated Master Plan
- Integrated Master Schedule
- **Single Numbering System**
- Applications
- Contractual Relationships
- IPPD Compatibility

What is a Single Numbering System?



- Assigns unique number to each activity
  - Track from IMP event, to accomplishment, to criteria, to IMS task
  - IMS task activity number links to the WBS
    - WBS structure created by contractor
  - Task “roll-up” relates the criteria to WBS
    - Provides traceability to SOW and Earned Value Management System (EVMS)

Single numbering system is highly recommended!

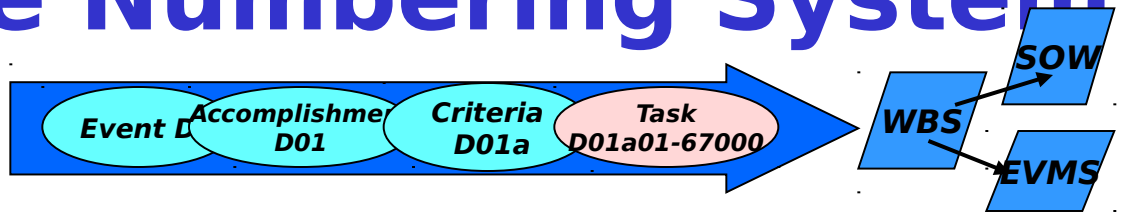
Single Numbering System

Generic Example

Event	Accomplishment	Criteria	Task	WBS
A	01	a	01	67000
			02	64000
		b	01	13000
			02	14100
	02	a	01	11000
			02	12000
		b	01	13000
		c	01	13000
B	01	a	01	22000

Activity number for this example is A02a01-11000

Single Numbering System



WBS # Assignment Example

Event	**D**	**First Flight Complete**
Accomplishment	**D01**	**First Flight Readiness Review Complete**
Criterion	**D01a**	**Test Planning Complete**
First Task	**D01a01-67000***	**Prepare flight test plans & procedures**
Second Task	**D01a02-64000***	**Submit flight test plans & procedures**

***WBS # only added to task activity number. A single criteria may cover multiple WBS elements. WBS #67000 is " test & evaluation"; #64000 is "data management"**

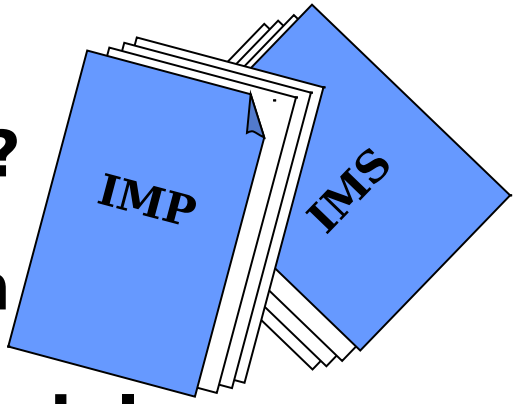
Single Numbering System

WBS Roll-Up Example

Activity #	Event Accomplishment Criteria	WBS REF
D	First Flight Complete	-
D01	First Flight Readiness Review Complete	-
D01a	Test Planning Complete	67000, 64000

Criteria D01a references WBS elements of its supporting tasks

General Description



- Overview/Why IMP/IMS?
- Integrated Master Plan
- Integrated Master Schedule
- Single Numbering System
- Applications
- Contractual Relationships
- IPPD Compatibility

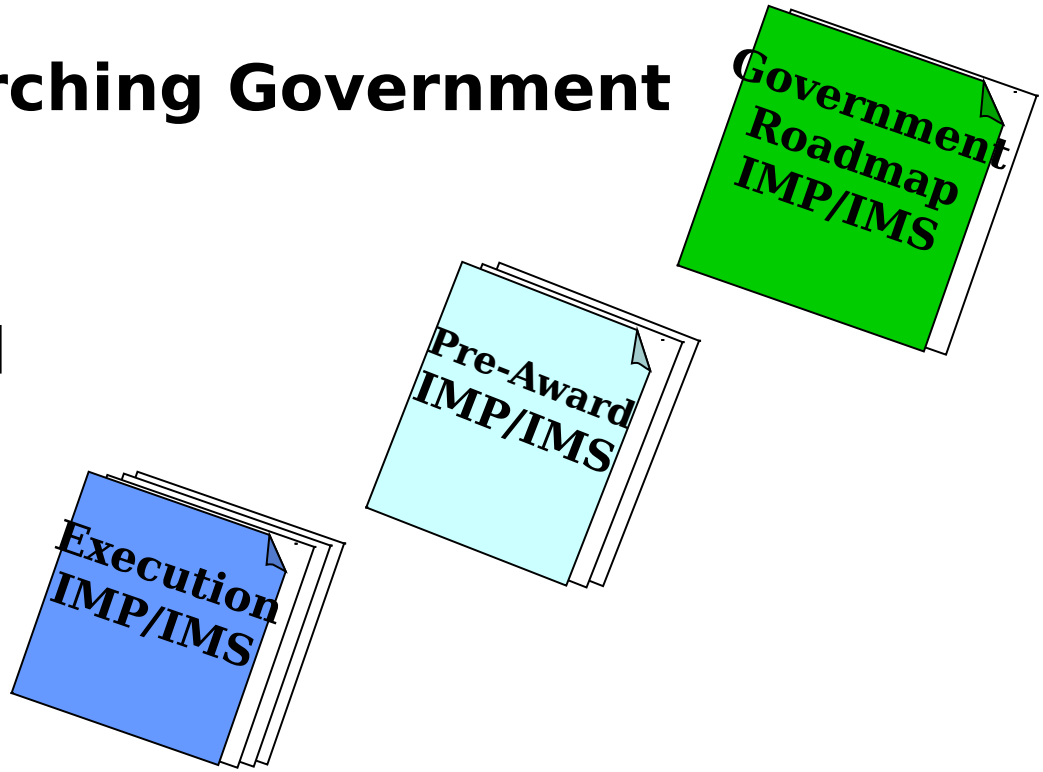
IMP/IMS General Application

- **Any program/project, in any phase**
  - **From initial program/project office planning to contract closeout for contracted programs**
  - **From initial planning to completion for government-only in-house programs**

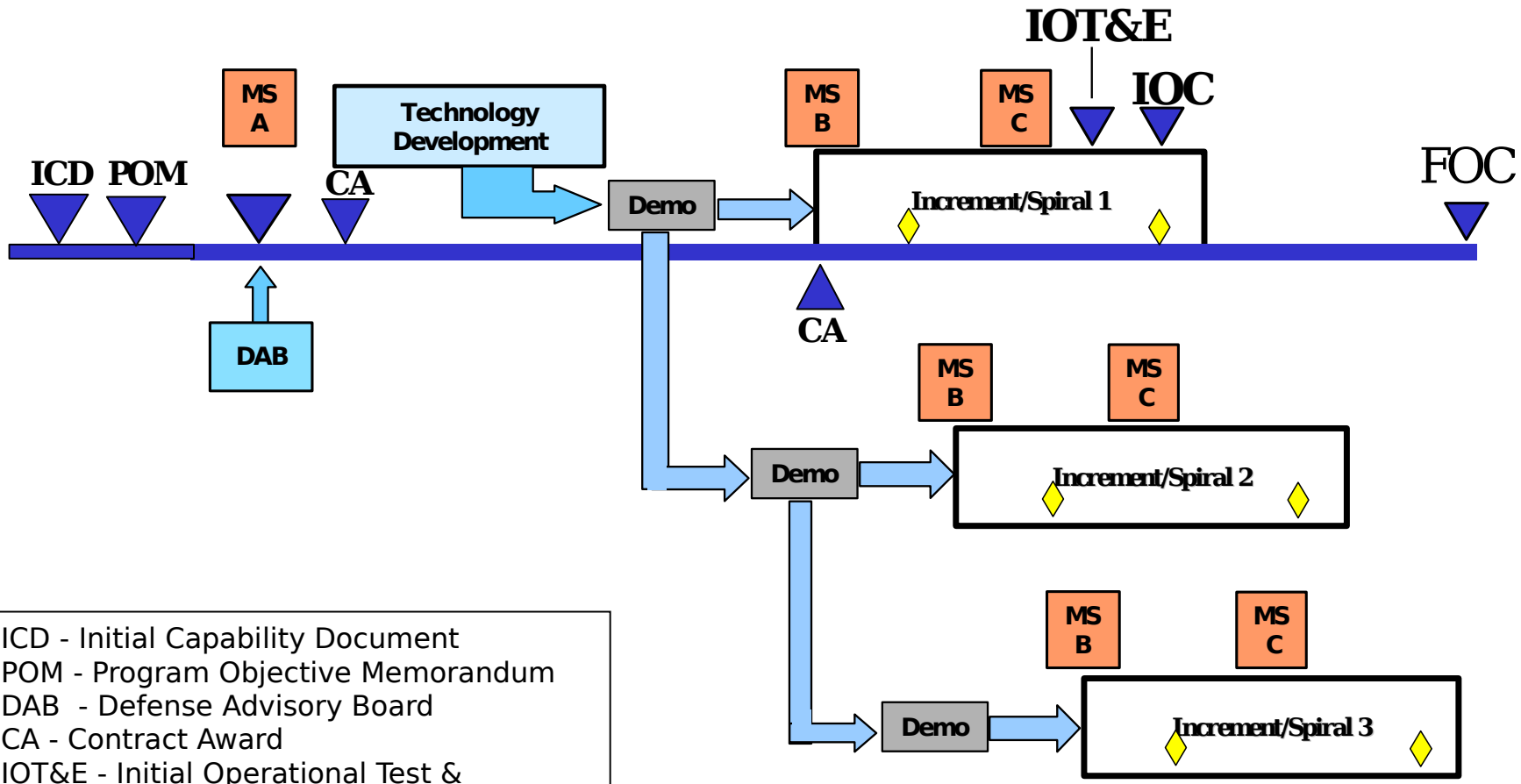
- **Use is independent of complexity, size, or cost**
  - **These factors may affect required level of detail and amount of tailoring**

Specific Applications

- **We'll discuss three specific applications**
  - **An over-arching Government Roadmap**
  - **Pre-Award**
  - **Execution**

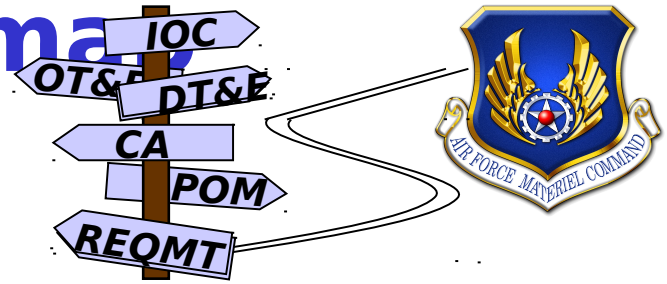


Government Roadmap IMP/IMS -- Example



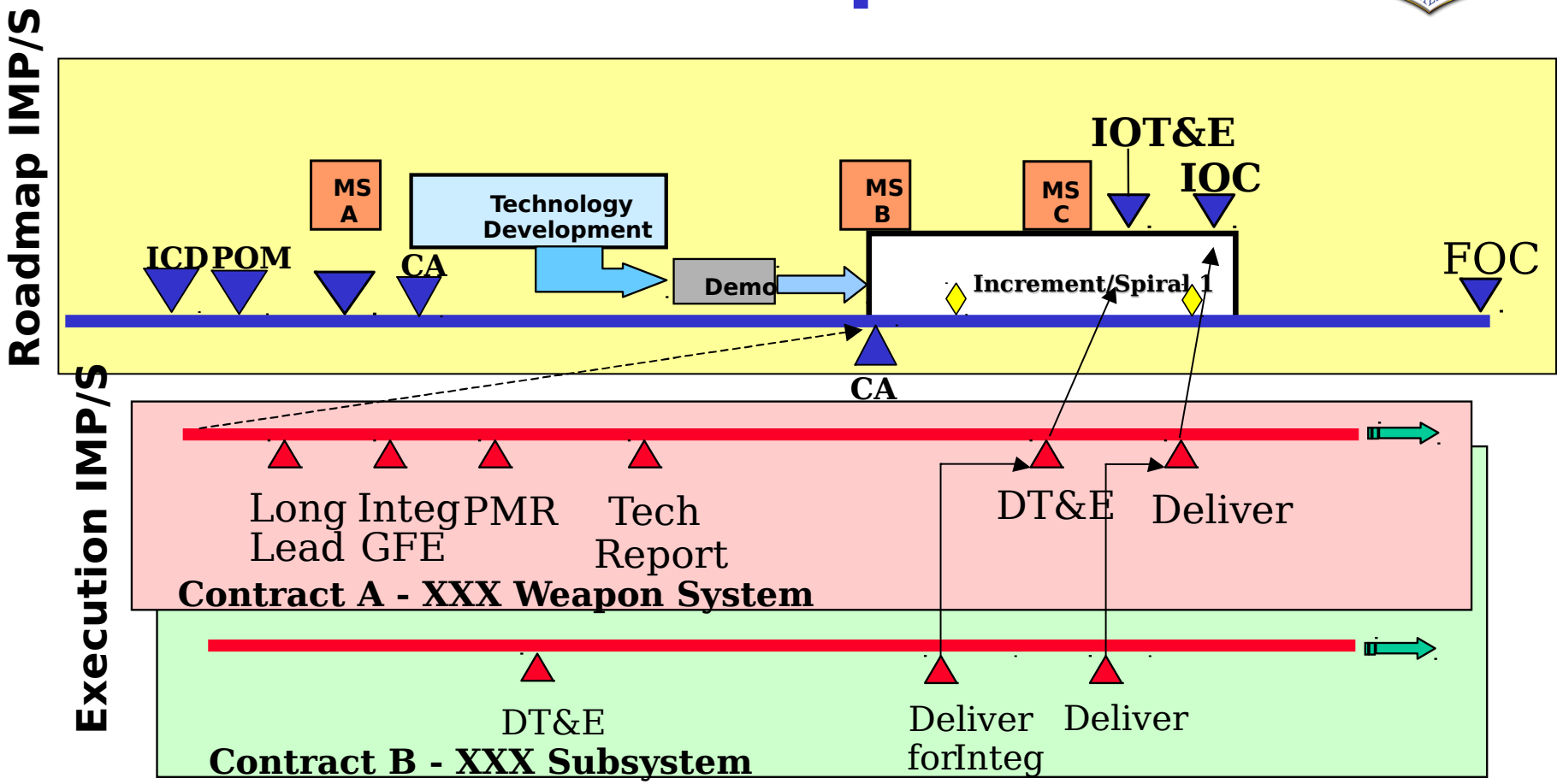
ICD - Initial Capability Document
POM - Program Objective Memorandum
DAB - Defense Advisory Board
CA - Contract Award
IOT&E - Initial Operational Test & Evaluation
IOC - Initial Operational Capability
FOC - Final Operational Capability

Government Roadmap IMP/IMS



- Government program office product
  - Do it early!
  - Conveys “big picture”; shows key events, capabilities evolution, schedule, constraints
  - Supports POM; helps fight budget cuts
  - Shows key schedule interfaces with supporting programs/activities/contracts
  - Supports pre-award activities; acquisition reviews, Industry Days, draft and final RFP
- Review ***regularly*** with ***all the players***
  - Progress, problems, and “heading check”
  - Update, as needed, to keep everyone current

Government Roadmap IMP/IMS -- Example



Integ – Integrate
GFE – Government Furnished Equipment
DT&E - Development Test & Evaluation
PMR – Program Management Review

▼ **Gov't responsibility, Gov't defined**
▲ **Contractor Responsibility, Contractor defined**

Pre-Award IMP/IMS

- **Help plan, manage, track activities necessary to make on-schedule award**
  - **Competitive or sole source awards**
  - **Key activities from all functional disciplines**
  - **Particularly helpful if operating in a multi-agency, multi-program, and/or multi-contract award environment**

- **Use is a function of acquisition strategy, complexity, contracting**

Pre-Award IMP/IMS --- Example

ID	Task Name	Duration	Start	Finish
1	**XXX CONTRACT AWARD**	**255 d**	**1/1/01**	**12/21/01**
2	**STRATEGY DEVELOPMENT COMPLETE**	**173 d**	**1/1/01**	**8/29/01**
55	**RFP DEVELOPMENT COMPLETE**	**129 d**	**1/3/01**	**7/2/01**
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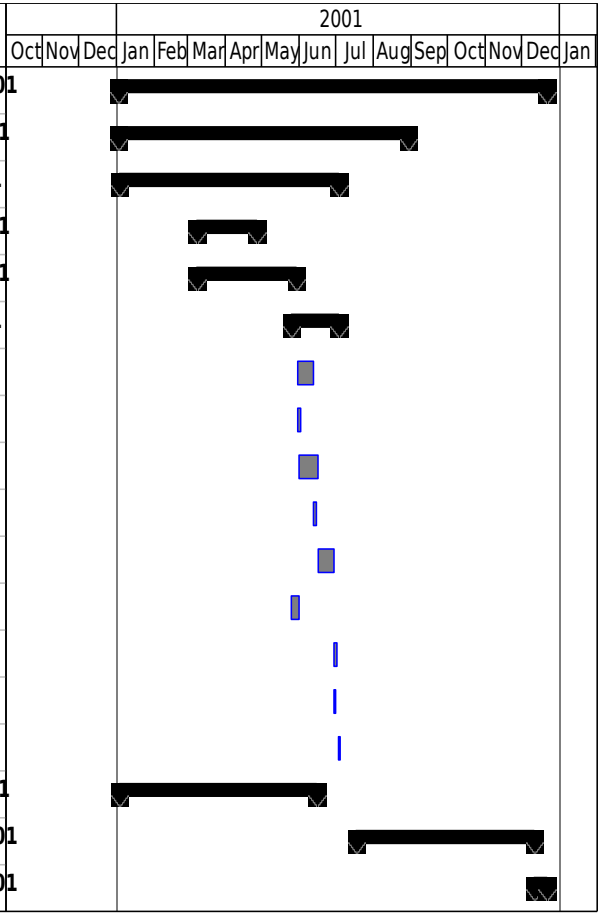


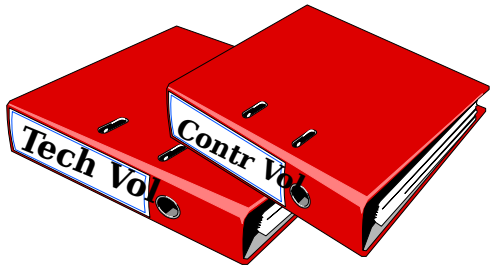
Condensed version of Pre-Award IMS

Execution IMP/IMS

- Contains detailed efforts to successf complete program

Important

- Same philosophy and methodology
  - Government-only or contracted
- Offerors submit as part of proposal



- On multi-contract programs, an Execution IMP/IMS for each contract
  - Interfaces reflected in Roadmap IMP/IMS

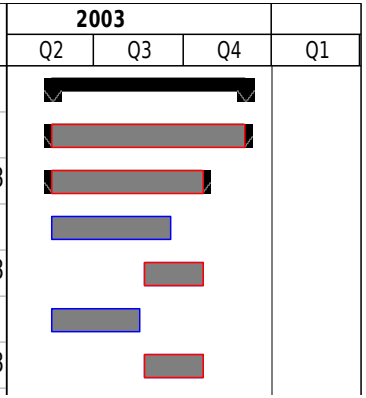
Execution IMP/IMS --- Example

IMP

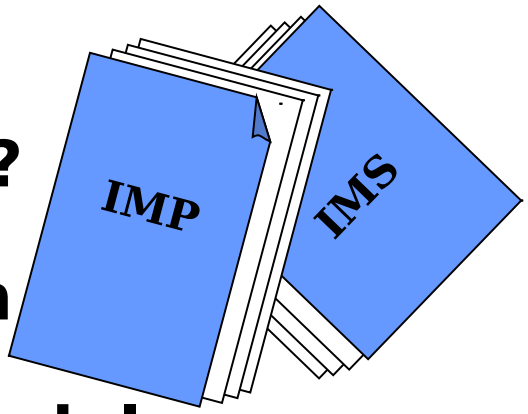
B	Event B - Final Design Review (FDR)	-
B01	Design Definition Complete	-
B01a	Design Deltas To Baseline Identified	1.3.1
B01b	Drawings Complete (Baseline & Deltas)	1.1.1, 1.3.1
B02	System Performance Assessment Reviewed	-
B02a	Initial Weight Analysis Complete	1.3.1
B02b	Electrical Current Consumption Report Complete	1.3.1
B02c	Initial Reliability, Maintainability, & Availability Predictions Complete	1.3.3
B02d	System Safety Hazard Analysis Complete	1.3.4
B03	Initial Test And Manufacturing Planning Reviewed	-

IMS

ID	Activity#	Task Name	Dur	Start	Finish
88	C	Event C - Test Readiness Review/Production Readiness Review (TRR/P	145 d	5/16/03	12/4/03
89	C01	First Article Build, Assembly and Inspection Complete	142 d	5/16/03	12/1/03
90	C01a	First Article Material Purchase and Build Complete	112 d	5/16/03	10/20/03
91	C01a01-1.2.2	Material Procurement (existing design - Version 1)	88 d	5/16/03	9/16/03
92	C01a02-1.2.2	Material Procurement (delta design - Version 1a)	44 d	8/20/03	10/20/03
93	C01a03-1.1.2.1	Fabricate in-house parts (existing design - Version 1)	66 d	5/16/03	8/15/03
94	C01a04-1.1.2.1	Fabricate in-house parts (delta design - Version 1a)	44 d	8/20/03	10/20/03



General Description



- Overview/Why IMP/IMS?
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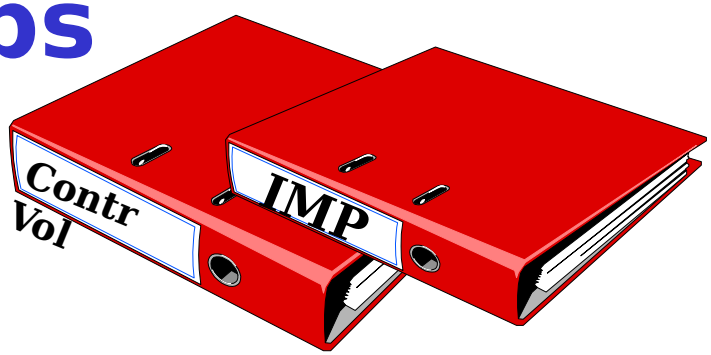
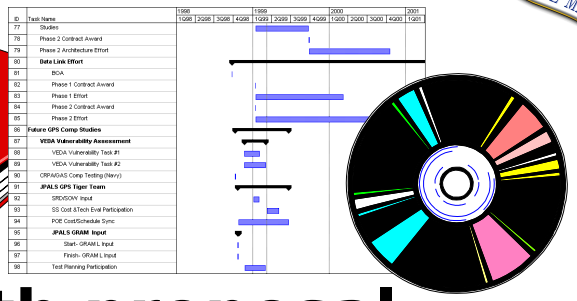
IMP Contractual Relationships

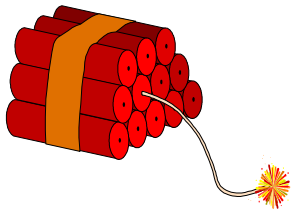


- **Execution IMP**
  - **Normally submitted with proposal Contract Volume and placed on contract**
  - **RFP may require, or offeror may desire, adding dates from completed IMS for a *limited* set of *selected* IMP events**
  - **Review at Post-Award Conference**
  - **Becomes mutually agreed-to approach for program execution**

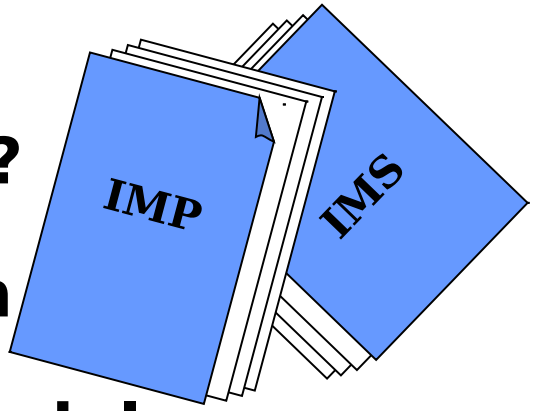
IMS Contractual Relationships



- **Execution IMS**
  - **Normally submitted with proposal Technical Volume**
  - ***Should not be placed on contract***
    - **Change in a task's content, start or complete date could trigger contract change**
    - **Can be a contract deliverable (CDRL, DAL, EDI)**



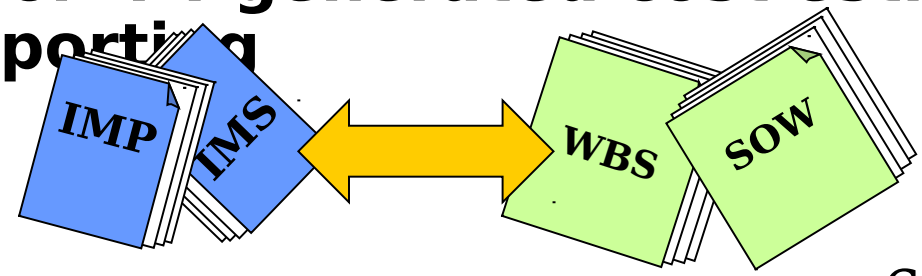
General Description



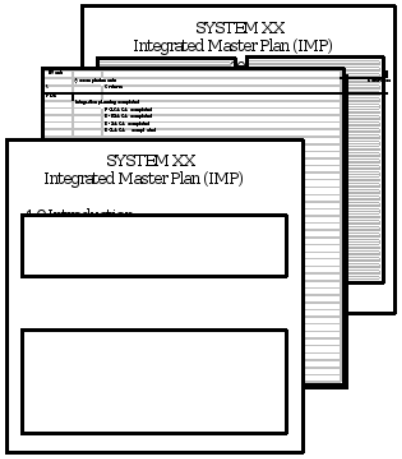
- Overview/Why IMP/IMS?
- Integrated Master Plan
- Integrated Master Schedule
- Single Numbering System
- Applications
- Contractual Relationships
- IPPD Compatibility

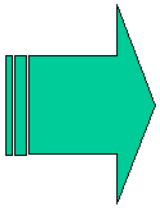
IPPD Compatibility

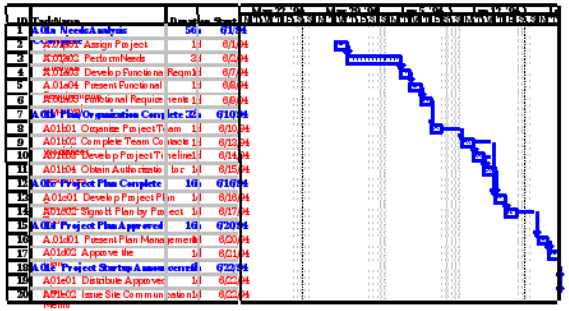
- Application of IPPD philosophy
  - Contains the necessary functional activities to produce the product
  - Directly links activities to responsible Integrated Product Team (IPT)
    - PM establishes and oversees all IPTs
  - Ties directly to WBS and SOW
    - Defines products, key processes, and tasks
    - Basis for IPT-generated cost estimates and reporting



IMP & IMS
Description Summary







Integrated Master Plan (IMP)

- *Event based plan*
- *Events, accomplishments, criteria*
- *Optional narratives*
- *Contractual*

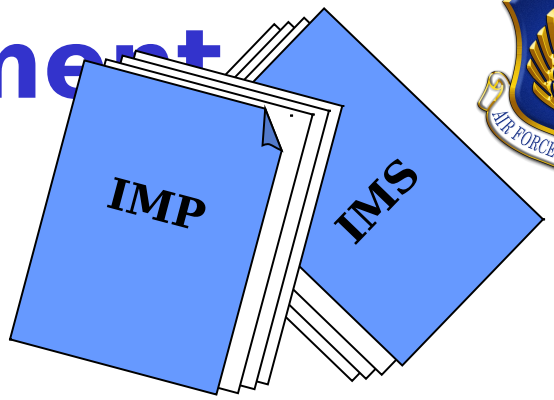
Integrated Master Schedule (IMS)

- *Task & calendar based schedule*
- *Level of detail necessary for day -to -day execution*
- *Not contractual*

Course Outline

- Learning Objectives
- IMP/IMS General Description
- **IMP/IMS Development and Implementation**
- Getting Help

IMP/IMS Development



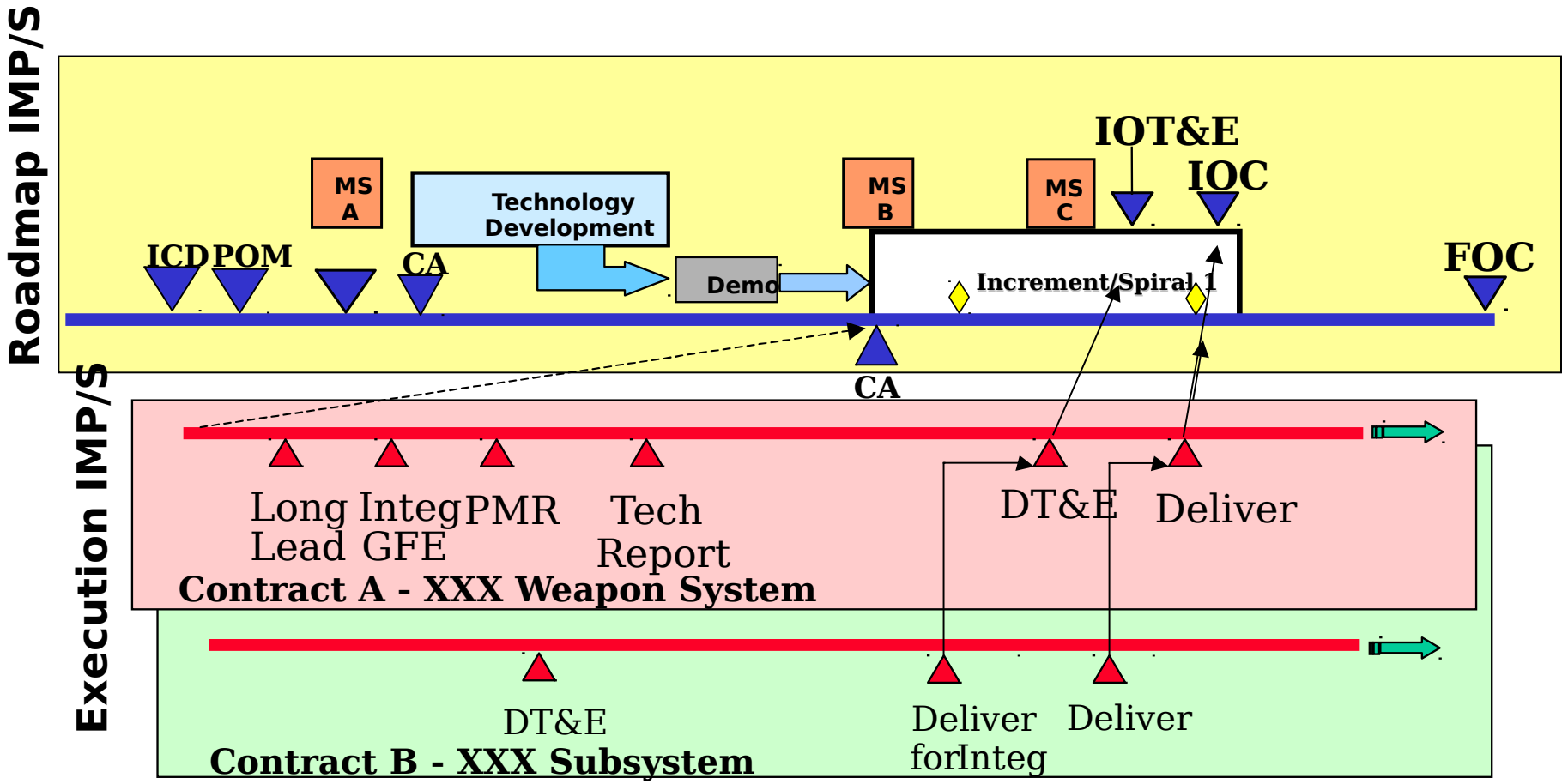
- ***Government Roadmap IMP/IMS***
- ***Pre- Award IMP/IMS***
- ***RFP Guidance***
- ***Execution IMP/IMS***
- ***Evolutionary Acquisition***

Government Roadmap IMP/IMS

Summarizes entire program

- Begin during initial program/project definition
- Include key internal events or activities
  - e.g., contract award, DT&E, deliveries, IOC
- Include key external events, activities and interfaces
  - e.g., OT&E, critical GFE availability, DoD Milestone Reviews, integration points for multi-contract/multi-agency activities
- Frequently maintained as a combined IMP/IMS in Gantt-type format
- Living document
  - Changes may be internally or externally driven

Government Roadmap IMP/IMS -- Example

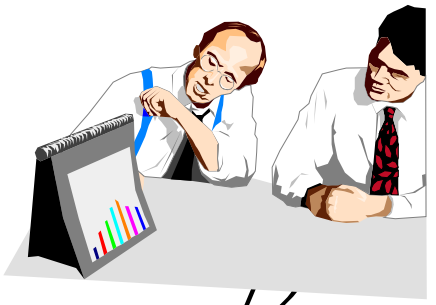


▼ Gov't responsibility, Gov't defined

▲ Contractor Responsibility, Contractor defined

Government Roadmap IMP/IMS

- **Share with prospective offerors and affected contractors**
  - **RFIs, Industry Days, draft & final RFP**
  - **Framework for IMP/IMS guidelines in the RFP**
- **All partners need full access during program execution to keep planning and scheduling current**



Pre-Award IMP/IMS

- Used to plan and track activities necessary to reach a contract award
- Easily captured in one document or file
- Often follows Execution IMP/IMS structure (events, accomplishments criteria and tasks)
  - All levels not required
- Tailored to specific acquisition
- Templates may be available at local ACE

Pre-Award IMP/IMS

ID	Task Name	Duration	Start	Finish
1	**XXX CONTRACT AWARD**	**255 d**	**1/1/01**	**12/21/01**
2	**STRATEGY DEVELOPMENT COMPLETE**	**173 d**	**1/1/01**	**8/29/01**
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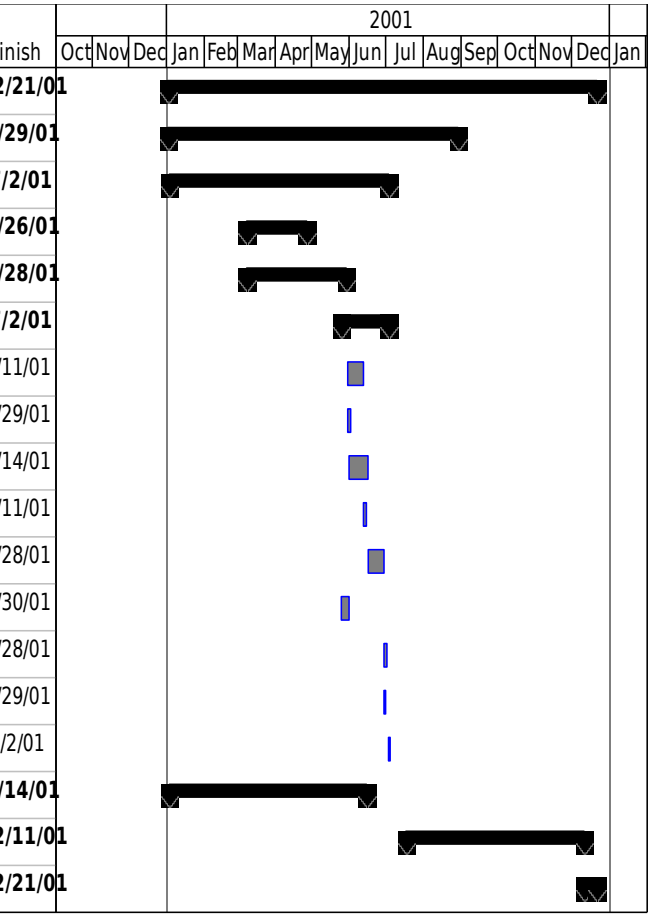


RFP Considerations - Overview

- **Guidance should:**
  - **Supplement the IMP/IMS guide**
    - **No need to duplicate what's in guide**
  - **Be tailored to program**
  - **Be communicated early**
    - **Industry Days, draft/final RFP (Sect L)**
  - **Minimize specific requirements**
    - **Requirements must "earn their way on"**
    - **Avoid late changes to requirements**
      - ✓ ***Can waste valuable resources at contractor***

RFP Considerations

- **Want contractor to propose the systems they use to plan and manage**
- **Proposed WBS structure should reflect the contractor's method for managing program funding**
- **IMP/IMS may be used to evaluate contractor's program approach**
  - **Focus on elements relevant to Section M**

RFP Considerations - Overview

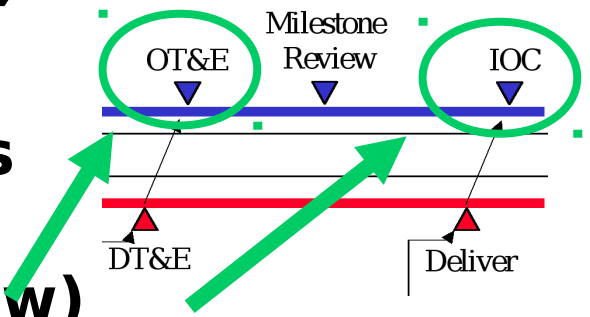
Consideration: Offerors should also review Section B (Supplies or Services and Price/Costs), Section F (Deliveries or Performance) and the CDRL (DD Fm 1423), as they will often provide supplemental requirements to be considered in the development of the IMP/IMS.

Qty ITEM	Unit Price SUPPLIES OR SERVICES	Purch Unit	Total Item A
0001		2 EA	
	Noun:	CANDIDATE AIR FORCE SUBSCALE AERIAL TARGETS (AFSAT)	
	ACRN:	9	
	NSN:	N - Not Applicable	
	Contract type:	J - FIXED PRICE AWARD FEE	
	Inspection:	SOURCE	
	Acceptance:	SOURCE	
	FOB:	DESTINATION	
	Descriptive Data: The contractor shall build, integrate, test, qualify, and deliver 2 pre-production AFSATs in accordance with the documents in Section C.		
0002		1 LO	
	Noun:	FLIGHT DEMONSTRATION & SUPPORT	
	ACRN:	9	

hould review to ensure above information is consistent with Section L

RFP Considerations

- **Minimum required activities**
  - **Events (OT&E Complete, IOC, etc.)**
  - **Other required activities**
    - **Could be accomplishments or even criteria (e.g, Test Readiness Review)**
  - **Should reflect Roadmap IMP/IMS**
- **"Hard" Constraints**
  - **IOC, GFE Availability, OFP Test Dates**
  - **Funding profiles**
  - **Again, should reflect Roadmap IMP/IMS**



RFP Considerations

Page/line limits and/or "summary" IMS

- **Do not recommend**
- **Should be to level of detail contractor needs for day-to-day execution**
  - **Ideally, same tasks will be basis of cost & pricing**
- **Summarization of tasks**
  - **Can result in artificial task relationships**
  - **Drives "long duration" tasks and accompanying rationale**
  - **Non-value-added hours to "force-fit" schedule**

RFP Considerations

- Program-unique characteristics
  - Ex.: Need to integrate into a system OF
  - Ex.: Need for kits to support PDM
  - Ex.: Need for Readiness Spares Package (RSP)
- Narrative requirements
  - Processes program/project office feels are critical
  - Recommend contractor format be allowed
- Page limits for narratives
  - May be desired by evaluation team
  - Limit must be consistent with requirement
    - "Consideration" in guide has example of inconsistency

RFP Considerations

- **Required data fields**
  - If using MS Project, suggest standardized format

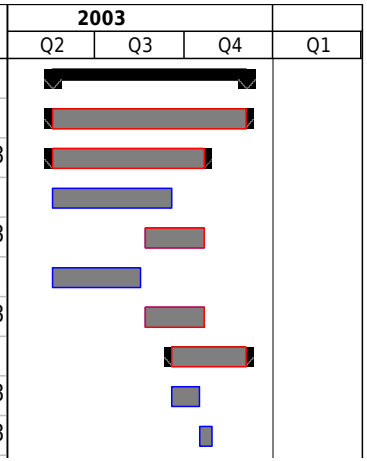
Additional Data	Text Field
IMP reference/code (single numbering system)	Text 1
WBS (if not part of IMP reference/code)	Text 2
SOW Reference (if not same as WBS)	Text 3
IPT	Text 4
Mission Capability Subfactor (RFP Section M)	Text 5
Risk (M-H)	Text 6
Contract Line Item (CLIN)	Text 7
Organizational/Functional Code	Text 10

Consideration: Use caution not to direct the use of fields that may already be used by other "plug-in" programs for the automated scheduling tools. For example, "Risk+," a risk assessment plug-in for Microsoft Project, uses Text fields 8 & 9.

RFP Considerations

- **IMS "hard copy" format (if required)**
  - **Example Gantt chart format**
    - **Activities are represented by bars showing the length of time for each activity**

ID	Activity#	Task Name	Dur	Start	Finish
88	C	Event C - Test Readiness Review/Production Readiness Review (TRR/F	145 d	5/16/03	12/4/03
89	C01	First Article Build, Assembly and Inspection Complete	142 d	5/16/03	12/1/03
90	C01a	First Article Material Purchase and Build Complete	112 d	5/16/03	10/20/03
91	C01a01-1.2.2	Material Procurement (existing design - Version 1)	88 d	5/16/03	9/16/03
92	C01a02-1.2.2	Material Procurement (delta design - Version 1a)	44 d	8/20/03	10/20/03
93	C01a03-1.1.2.1	Fabricate in-house parts (existing design - Version 1)	66 d	5/16/03	8/15/03
94	C01a04-1.1.2.1	Fabricate in-house parts (delta design - Version 1a)	44 d	8/20/03	10/20/03
95	C01b	First Article Assembly and Inspection/Test Complete	54 d	9/17/03	12/1/03
96	C01b01-1.1.2.1	Assemble first article (Version 1)	20 d	9/17/03	10/14/03
97	C01b02-1.1.2.1	Inspect/test First Article Version 1)	10 d	10/15/03	10/28/03



RFP Considerations

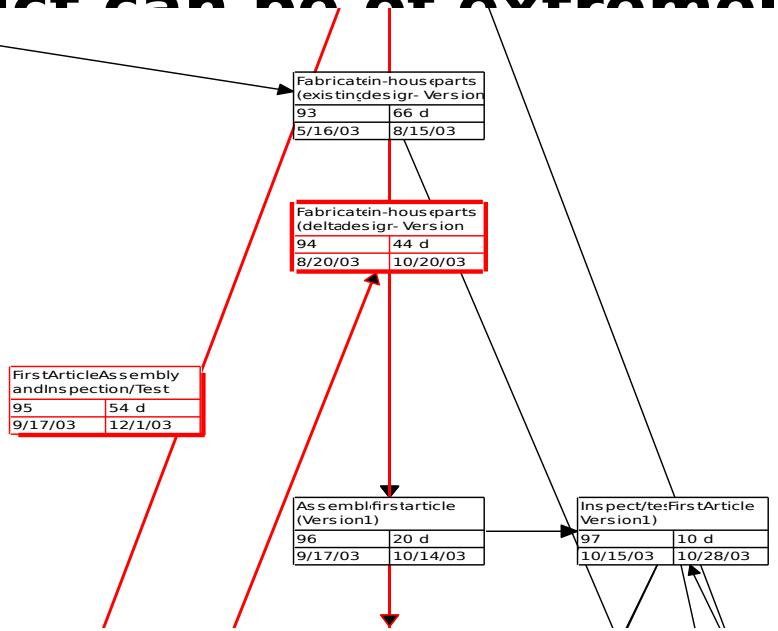
- **IMS "hard copy" format**
  - **Example tabular format**
    - **Tables containing data for each activity (duration, start date,finish**

ID	Activity#	Task Name	Dur	Start	Finish	Predecessors
88	**C**	**Event C - Test Readiness Review/Production Readiness Review (TRR/P**	**145 d**	**5/16/03**	**12/4/03**	
89	**C01**	**First Article Build, Assembly and Inspection Complete**	**142 d**	**5/16/03**	**12/1/03**	
90	**C01a**	**First Article Material Purchase and Build Complete**	**112 d**	**5/16/03**	**10/20/03**	
91	C01a01-1.2.2	Material Procurement (existing design - Version 1)	88 d	5/16/03	9/16/03	44
92	C01a02-1.2.2	Material Procurement (delta design - Version 1a)	44 d	8/20/03	10/20/03	84
93	C01a03-1.1.2.1	Fabricate in-house parts (existing design - Version 1)	66 d	5/16/03	8/15/03	44
94	C01a04-1.1.2.1	Fabricate in-house parts (delta design - Version 1a)	44 d	8/20/03	10/20/03	84
95	**C01b**	**First Article Assembly and Inspection/Test Complete**	**54 d**	**9/17/03**	**12/1/03**	
96	C01b01-1.1.2.1	Assemble first article (Version 1)	20 d	9/17/03	10/14/03	91,93
97	C01b02-1.1.2.1	Inspect/test First Article Version 1)	10 d	10/15/03	10/28/03	96,104

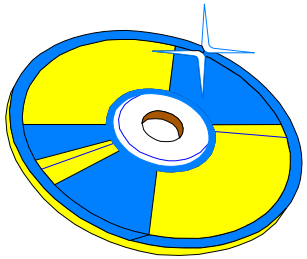
Consideration: Requesting a large number of data fields in the tabular format can significantly drive both the IMS size and number of pages. Some RFPs have asked for over twenty (20) fields to be included in the hardcopy submittal.

RFP Considerations

- IMS “hard copy” format
  - Example network diagrams (PERT charts)
    - Show relationships among tasks
    - Product can be of extremely large size

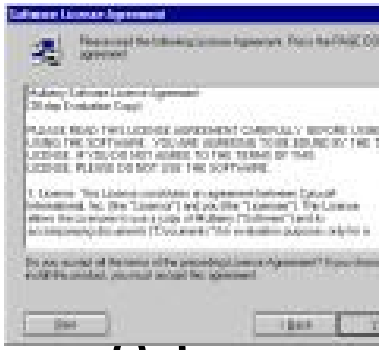


RFP Considerations



- Electronic format and media
  - MS Word xx, MS Project xx, CD-ROM, etc.
- Automated scheduling tool to be used
  - May be dictated for SS evaluation purposes

Consideration: The RFP may ask the contractor to address post-award scheduling tool issues such as training of the program/project office team, software tool licenses, etc.



RFP Considerations

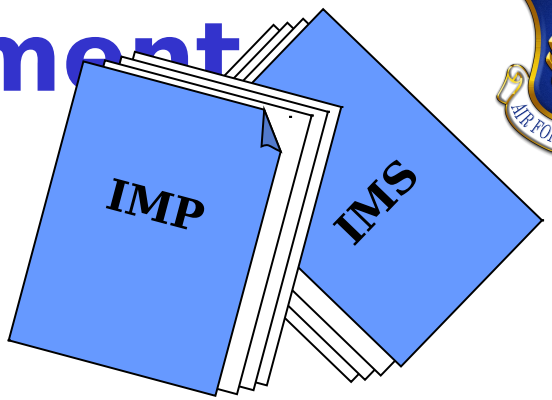
- **Post-Award Data Submittals**
  - **CDRL/DID, DAL, electronic access**
    - **Recommend tailoring and allowing contractor format**
    - **Current DID for IMS is DI-MISC-81183**

Consideration: If the DID is too detailed or prescriptive, it could lead to the maintenance of two separate products; the one the contractor submits, and another one they use to actually execute the program.

Consideration: Use caution to avoid conflicting guidance in the DID and Section L (ITO) of the RFP.

- **Other (e.g, rationale for "long-duration" tasks)**

IMP/IMS Development



- ***Government Roadmap IMP/IMS***
- ***Pre- Award IMP/IMS***
- ***RFP Guidance***
- ***Execution IMP/IMS***
- ***Evolutionary Acquisition***

Execution IMP Development General

- Same principles apply whether developed by contractor or program/project office
- Same principles apply whether competitive or sole source
- Activities in the IMP should not be expected to routinely change
  - Drives contract modifications

Execution IMP Development

- **Steps**
  - **Determine IMP structure/organization**
  - **Identify Events, Accomplishments and Criteria (EA&C)**
  - **Prepare introduction and narrative sections (may/may not be requirement for narratives)**
  - **Complete single numbering system**
  - **Iterate EA&C with IPTs during IMS development**

Execution IMP Development Organization

- Recommend the following (can be tailored)
  - Section 1 - Introduction
  - Section 2 - Events, Accomplishments and Criteria
  - Section 3 - Narratives (if required)
  - Section 4 - Glossary/Acronyms

Consideration: There has been considerable discussion over whether the IMP should be broken into Sections by IPT or WBS elements. The recommendation of this guide is that the IMP not be broken into sections, but kept as one "integrated" plan that encompasses all IPTs, WBS's and functional disciplines.

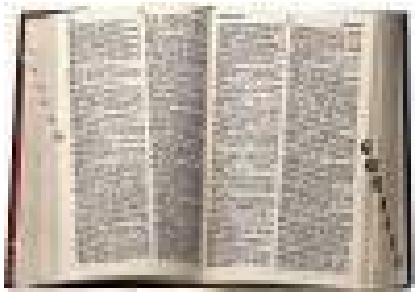
Execution IMP Development Introduction

- **Short description of the program***
- **Assumptions/ground rules***
- **Event and “action term” dictionary***
- **IPT organization and responsibilities**
- **Any unique features of the IMP**

* Minimum Content

Execution IMP Development Introduction

IMP Dictionary



- **Definitions of each event**
  - **Table or narrative**
  - **Good place to highlight risk mitigation efforts**

- **Common definition of verbs used in the accomplishments/criteria descriptions**
  - **e.g., approved, submitted, verified, assembled**
  - **Example in guide**

Execution IMP Development Introduction

Event Definitions (Example)

Event	Definition
Post-Award Conference (PAC)	The purpose of this event is to ensure that the contractor's management processes and tools have been implemented and that both the government and contractor have a common understanding of the program to be executed. The IMP Accomplishments and Criteria and overall schedule will be reviewed, as well as well as risk status and program metrics. The PAC Event represents the transition from initial post-contract award process implementation and planning updates to a major block of activity related to …

Execution IMP Development Introduction

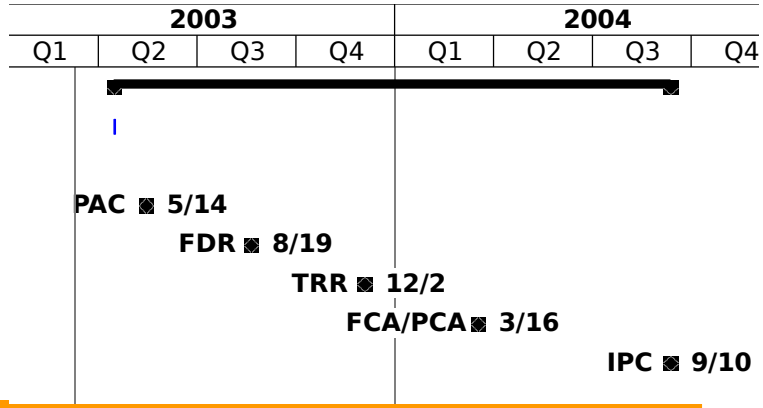
"Action Term" Definitions* (Example)

Analysis/Analyzed — The subject parameter(s) has been technically evaluated through equations, charts, simulations, prototype testing, reduced data, etc.
Approved — The subject item, data, or document has been submitted to the government and the government has notified the contractor that it is acceptable. For some data items, it is specified that no response constitutes approval.
Available — The subject item is in place/The subject process is operational/The subject data or document has been added to the Data Accession List
Complete(d) — The item or action has been prepared or accomplished and is available for use and/or review.
Concurrence — The government has expressed its agreement with the contractors proposed design, approach, or plan as documented in either formal correspondence or meeting minutes, presentations, etc.

*** Important to discuss these early with contractor to avoid later contract disputes**

Execution IMP Development Event Selection

- **Major points at which it is logical to measure program progress**
- **Distributed over program period**
- **Start with events required in RFP**
- **Expand to complete program**



Remember: every event is a contractual "happening"

Execution IMP Development Event Selection

- Sources for Events
  - Government Roadmap IMP/IMS
  - RFP
    - Requirements documents
    - Section L
    - Section B CLINs
  - Contractor selection
    - Based on analysis and individual approach
  - Legacy standards
    - MIL-STD-1521 - Technical Reviews And Audits for Systems, Equipments, and Computer S/W
    - EIA 632 - Processes for Engineering a System

Execution IMP Development Event Selection--Examples

Technical and Management Review Events
▪ Post Award Conference (PAC)
▪ System Requirements Review (SRR)
▪ Preliminary Design Review (PDR)
▪ Critical Design Review (CDR)
▪ Functional Configuration Audit (FCA)*
▪ Physical Configuration Audit (PCA)*
Development Events
▪ Subsystem Fabrication Complete*
▪ Subsystem Integration Complete*
▪ System Integration Complete*
▪ Design Readiness Review (DRR)
Demonstration/Verification Events
▪ Test Readiness Review (TRR)*
▪ First Flight Readiness Review*
▪ First Flight Complete
▪ DT&E/OT&E Complete

*** Could also be accomplishments in support of other events rather than an individual event**

Execution IMP Development Accomplishment Selection

- As a minimum, should reflect
  requirements and activities
  specifically identified in the I
- Each accomplishment should
  substantially contribute to the success of
  the related event
- Accomplishments should reflect the required progress of all functional disciplines

Execution IMP Development
Accomplishment Selection--Examples

Event *Accomplishment*
Preliminary Design Review
Design Implementation Trade Studies Complete
System Architecture Update Complete
System Requirements Allocation Complete
Aircraft Preliminary Design Complete
PDR Conducted
Test Readiness Review
*Test Assets Available**
*Test Planning Complete**
Test Support in place
FCA/PCA
Formal Qualification Test (FQT) Complete
*Prototype Production Complete**
FCA/PCA Conducted

* **Could also be criteria in support of other accomplishments rather than an individual accomplishment**

Execution IMP Development
Event vs Accomplishment vs Criteria

Event
Accomplishment
Test Readiness Review
Test Assets Available
Test Planning Complete
Test Support in place

Event
Accomplishment
Criteria
First Flight Complete
Test Readiness Review Complete
Test Assets Available
Test Planning Complete
Test Support In Place

Execution IMP Development Criteria Selection

- As a minimum, should reflect requirements and activities specifically identified in the RFP
- Should provide evidence of completion of the associated accomplishment
- Certain events lend themselves to the use of “entrance” and “exit” criteria

Execution IMP Development Criteria Selection--Examples

Event *Accomplishment* Criteria	Entrance - ENT Exit - EX
Preliminary Design Review	
Design Implementation Trade Studies Complete	
Airframe preliminary design trade studies complete	ENT
Avionics preliminary design trade studies complete	ENT
System Requirements Allocation Complete	
System requirements allocated to subsystems	ENT
Preliminary segment performance requirement documents complete	ENT
All Functional And Physical Interface Requirements Identified	
Preliminary Interface Definition Complete	ENT
Draft interface control documents complete	ENT
Preliminary Design Assessments Complete	
Preliminary System Safety Hazard Analysis Complete	ENT
Design risk assessment updated and risk reduction options identified	ENT
PDR Conducted	
PDR Agenda and Data Items Submitted	ENT
PDR Meeting Conducted and Action Items Established	EX
LRIP Decision	
QT&E Complete	
Formal Qualification Test (FQT) Complete	
QT&E Performed	
QT&E Failures Resolved	
OT&E Complete	
OT&E Assets Delivered	
OT&E Performed	

Execution IMP Development Criteria Selection

Consideration: Experience indicates that there will frequently be “open items” associated with the completion of events (e.g., Major Review action items, Deviations, Waivers, retest). If the open items are severe enough, the event may be deemed incomplete and the program not allowed to progress further. However, there will be other times when it is prudent to identify action items and their closure plans, but designate the event complete. One possible way to achieve this flexibility and still maintain program discipline is to place a criterion in each event for the “resolution of action items” from the previous event.

Execution IMP Development EA&C Table

- **Put EA&C into table**
  - **Include activity# and WBS reference**

Activity #	Event Accomplishment Criteria ENT - Entrance EX - Exit	WBS
A	Test Readiness Review (TRR)	
A01	Test Planning Complete	
A01a	Approved Test Procedures Available ENT	11200, 73000

Note : WBS reference is a “roll-up” from individual tasks under each criteria - see “single numbering section”

Execution IMP Development
IMP Narratives

Task Narratives

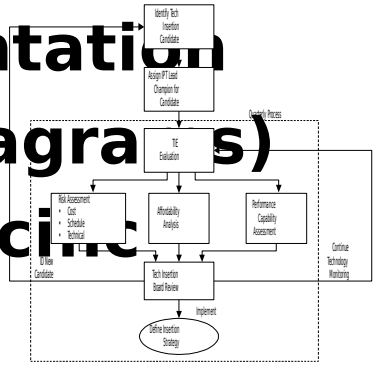
- **Describe tasks not normally found in the IMP**
  - **Level of Effort (LOE) tasks)**
    - ✓ ***System Safety program***
    - ✓ ***Quality Assurance Program***
  - **Broad-level tasking traditionally found in SOO/SOW**

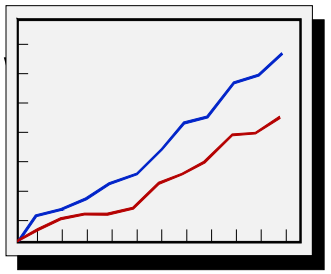
Consideration: While descriptions of LOE tasks and processes can be placed in the narratives, there may be significant and specific outputs of these tasks and processes. Examples would be a Quality Assurance Plan or a System Safety Hazard Analysis. These types of outputs should be reflected in the IMP and/or IMS.

Execution IMP Development
IMP Narratives

Process Narratives

- **Address key [illegible]loping or implementing a process/procedure**
  - **Reference to governing documentation**
  - **Overview of the process (flow diagrams)**
  - **How it will be tailored to the specific program/project**
  - **How the process will be implemented on the specific program/project**
  - **Description of any metrics that will be used to measure the process**





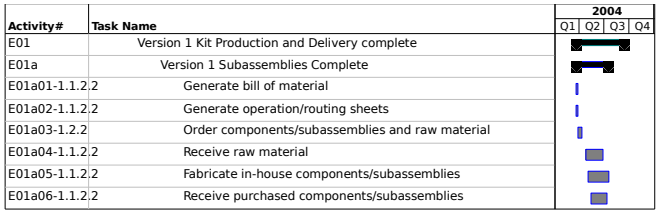
Execution IMS Development

Execution IMS Development General

- Again, same principles apply whether developed by contractor or government
- EA&C of IMP form IMS skeletal structure
  - Detailed tasks represent the individual work efforts that consume resources and support each of the specific criteria.
  - Through this structure, all IMS tasks are directly traceable to the IMP

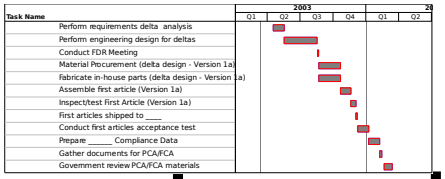
Activity#	Task Name	20 Q2
A	Event A - Post Award Conference/Baseline Design R[redacted]w (P	
A01	Management Planning Reviewed	
A01a	Program Organization Established	
A01a01-1.2.1	Identify contractor team members	
A01a02-govt	Identify government team members	

Execution IMS Development General



Activity#	Task Name	2004 Q1	Q2	Q3	Q4
E01	Version 1 Kit Production and Delivery complete				
E01a	Version 1 Subassemblies Complete				
E01a01-1.1.2.2	Generate bill of material				
E01a02-1.1.2.2	Generate operation/routing sheets				
E01a03-1.2.2	Order components/subassemblies and raw material				
E01a04-1.1.2.2	Receive raw material				
E01a05-1.1.2.2	Fabricate in-house components/subassemblies				
E01a06-1.1.2.2	Receive purchased components/subassemblies				

- **Objectives of IMS**
  - **Consistency with IMP**
  - **Illustrate interrelationships among events, accomplishments, criteria and tasks**
  - **Illustrate start/finish dates and duration for each event, accomplishment, criteria and task**
  - **Provide critical path**
  - **Provide ability to sort schedules multiple ways (e.g., by event, by IPT)**
  - **Provide schedule updates on a regular basis**



Execution IMS Development General

- **Objectives of IMS (cont'd)**
  - **Indicate all completed actions**
  - **Indicate schedule slips with original and rescheduled dates**

Activity#	Task Name	2004 Q1	Q2	Q3	Q4
E01	Version 1 Kit Production and Delivery complete				
E01a	Version 1 Subassemblies Complete				
E01a01-1.1.2.2	Generate bill of material				
E01a02-1.1.2.2	Generate operation/routing sheets				
E01a03-1.2.2	Order components/subassemblies and raw material				
E01a04-1.1.2.2	Receive raw material				
E01a05-1.1.2.2	Fabricate in-house components/subassemblies				
E01a06-1.1.2.2	Receive purchased components/subassemblies				

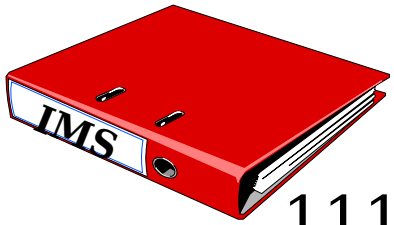
  - **Provide electronic access to current schedule for contractor and program/project office personnel**

  - **Capability to perform "what if" exercises**
  - **Maintain consistency with the work package definitions and the Earned Value Management System (EVMS)**

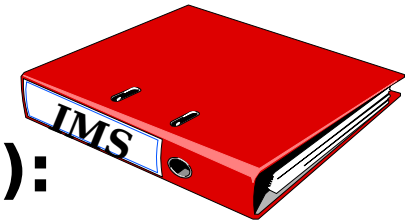
Execution IMS Development Steps

- Determine IMS “hard copy” organization
- Transport IMP EA&C into automated tool
- IPTs identify detailed tasks and durations
- IPTs identify task constraints/relationships
- IPTs iterate with IMP/IMS POC
- Complete/update single numbering system
  - Use contractor’s WBS structure
- Perform critical path/schedule risk analysis
- Complete IMS document

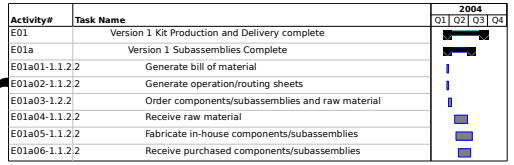
Important



Execution IMS Development Organization--IMS Document



- **Recommend (can be tailored):**
  - **Section 1 - Introduction**
  - **Section 2 - Hardcopy For**



Activity#	Task Name	2004 Q1	Q2	Q3	Q4
E01	Version 1 Kit Production and Delivery complete				
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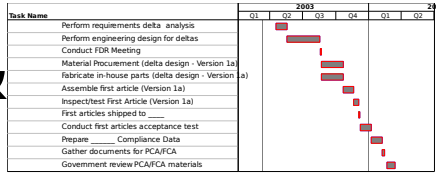
E01a01-1.1.2.2	Generate bill of material				
E01a02-1.1.2.2	Generate operation/routing sheets				
E01a03-1.2.2	Order components/subassemblies and raw material				
E01a04-1.1.2.2	Receive raw material				
E01a05-1.1.2.2	Fabricate in-house components/subassemblies				
E01a06-1.1.2.2	Receive purchased components/subassemblies				

  - **Section 3 - Schedule Rationale (if required)**
  - **Section 4 - Critical Path &**



Task Name	2003 Q1	Q2	Q3	Q4	20 Q1	Q2
Perform requirements delta analysis						
Perform engineering design for deltas						
Conduct FDR Meeting						
Material Procurement (delta design - Version 1a)						
Fabricate in-house parts (delta design - Version 1a)						
Assemble first article (Version 1a)						
Inspect/test First Article (Version 1a)						
First articles shipped to ____						
Conduct first articles acceptance test						
Prepare _____ Compliance Data						
Gather documents for PCA/FCA						
Government review PCA/FCA materials						

  - **Section 5 - Glossary/Acronyms**

Execution IMS Organization Introduction

- Short overview of IMS*
- Assumptions/ground rules*
  - Calendar used/holidays
  - Constraints
- Any unique features of the IMS
  - Single numbering system
  - Additional data fields

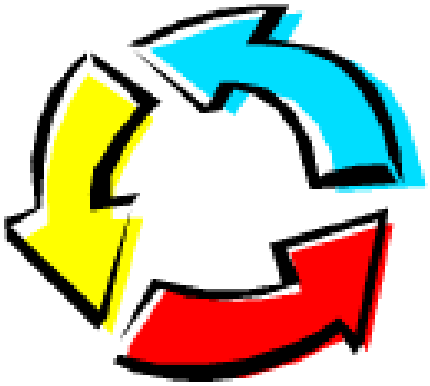
Additional Data	Text Field
IMP reference/code (single numbering system)	Text 1
WBS (if not part of IMP reference/code)	Text 2
SOW Reference (if not same as WBS)	Text 3
IPT	Text 4
Mission Capability Subfactor (RFP Section M)	Text 5
Risk (M-H)	Text 6
Contract Line Item (CLIN)	Text 7

- How IMS will be managed and maintained

* Minimum Content

Execution IMS Development Detailed Task Identification

- **Responsibility for each criterion is assigned to the appropriate IPT/POC**
- **Each IPT/POC then develops their portion of the IMS**
  - **Identify the necessary tasks to support the IMP criteria and accomplishments**
- **Iterate with IMP/IMS POC**



Execution IMS Development Detailed Task Identification

- **Level of Effort (LOE) tasks**
- **If included, recommend placing at end of IMS**
  - **Do not tie to rest of IMS tasks**

Consideration: If LOE tasks are placed in the electronic IMS, caution should be used to avoid these tasks "grabbing" the critical path. This can happen if any LOE task becomes the last completed activity in the IMS. This is most likely to happen during the running of statistical "Monte Carlo" risk assessment tools. This can be avoided by artificially keeping the completion date of LOE tasks well short of the program ending date and not allowing the duration to vary during the assessment.

Execution IMS Development Detailed Task Identification

- **Required Information**
  - **Task name**
  - **Duration**
  - **Constraint type**
  - **Predecessor(s)**
  - **Minimum and maximum durations (If required for SRA - will be discussed under risk section)**
- **Confirm related WBS element with IMP/IMS POC (WBS Dictionary)**

Execution IMS Development Task Name

- Use active tense
- Group under appropriate criteria
- Differentiate recurring tasks
  - Prepare PDR agenda
  - Prepare CDR agenda
- Examples
  - Perform ____ detailed design
  - Code and test ___ CSCI software
  - Order ____ materials
  - Fabricate ____ detailed parts

Execution IMS Development Task Duration

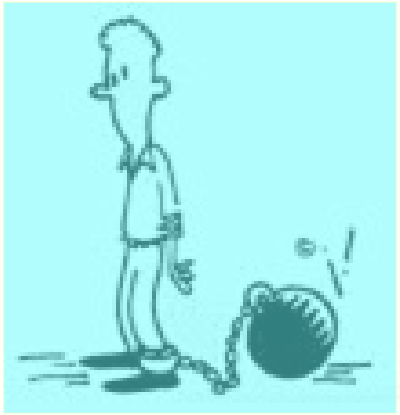
- **Usually expressed in days or weeks**
  - ***Remember*: In most scheduling programs, there are 5 days in a week and 22 days in a month**

- **Task durations should not be too long**
  - **Limits opportunity for timely progress review**
  - **If longer than six months, look to break up into shorter tasks (not a hard and fast rule)**

- **May be appropriate (or directed) to include rationale for long duration**

Execution IMS Development Constraint Types

- **No constraint - As Soon as Possible (ASAP)**
  - **Preferred and most common**
- **“Soft” constraints**
  - **Can’t move left, but can slip**
  - **Won’t Invalidate SRA**
- **“Hard” constraints**
  - **Can’t slip, or can’t move at all**
  - **Will not give a valid SRA**
- **Common to request rationale for other than ASAP**



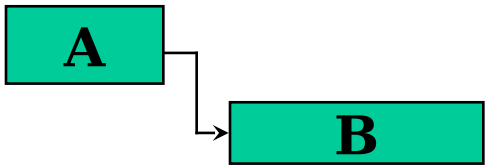
Execution IMS Development "Soft Constraints"

- **Start No Earlier Than**
  - **Tasks not controlled by your team (e.g., GFE delivery)**
  - **Tasks to be scheduled with other contractor programs for efficiency (e.g., schedule a shared production facility)**
- **Finish No Earlier Than**
  - **"Just-in-time" tasks on separate contracts (e.g., desire to hold delivery on two components until third component is available)**

Execution IMS Development "Hard Constraints"

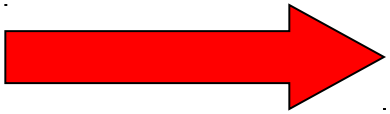
- **Avoid use of "hard" constraints**
  - ***Start No Later Than***
  - ***Finish No Later Than***
  - ***Must Start On***
  - ***Must Finish On***

Execution IMS Development Task Relationships

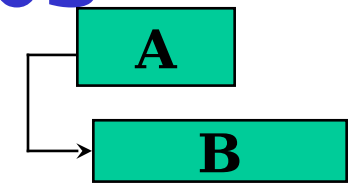


- **Finish to Start (FS)**
  - **Finishing date of predecessor determines start of dependent task**
  - **Standard “one task must finish before another starts” link**

Example: Cannot “Ship an item” until “Integrate and test the item” is complete



Execution IMS Development Task Relationships

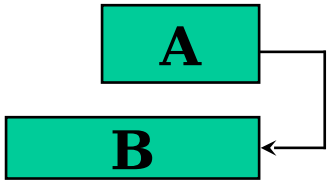


- **Start to Start (SS)**
  - **Starting date of predecessor determines start of dependent task**
  - **Used when one task cannot start until another starts (often involves some lag time); overlapping tasks**

Example 1: Can't start "Determine action items" until start of "Conduct review" (concurrent tasks)

Example 2: Can't start "Analyze test results" until after start of "Test" (don't have to wait until test is complete)

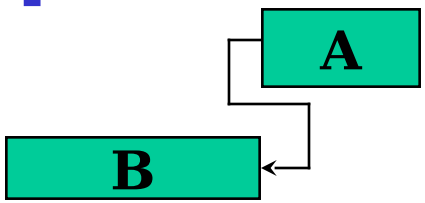
Execution IMS Development Task Relationships



- **Finish to Finish (FF)**
  - **Finish date of predecessor determines finish of dependent task**
  - **May be used when two or more tasks being performed in parallel need to complete at the same time**
  - **May be used when one task can't finish until another finishes, but start dates are unrelated**

Example: "Perform airframe detail design" can start before "Perform wind tunnel test," but can't finish until test is complete.

Execution IMS Development Task Relationships

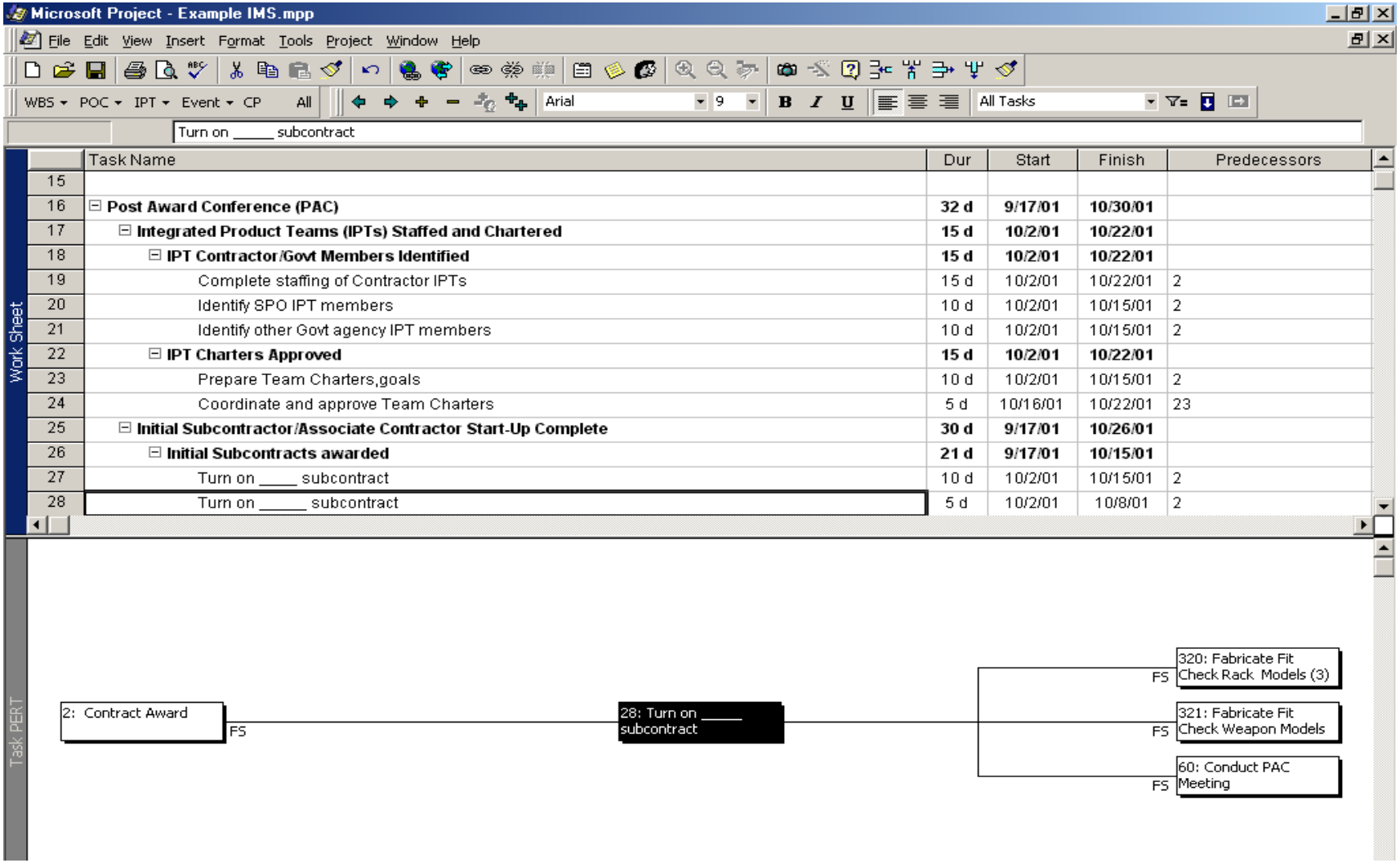


- **Start to Finish (SF)**
  - **Start date of predecessor task determines finish date of dependent task**
  - **Often used for "just-in-time activities"**

Example: Task is "Prepare viewgraphs for review", which is driven by when "Conduct the review" starts (if review moves, viewgraphs move with it)

- **Can view relationships with "Task PERT" view**

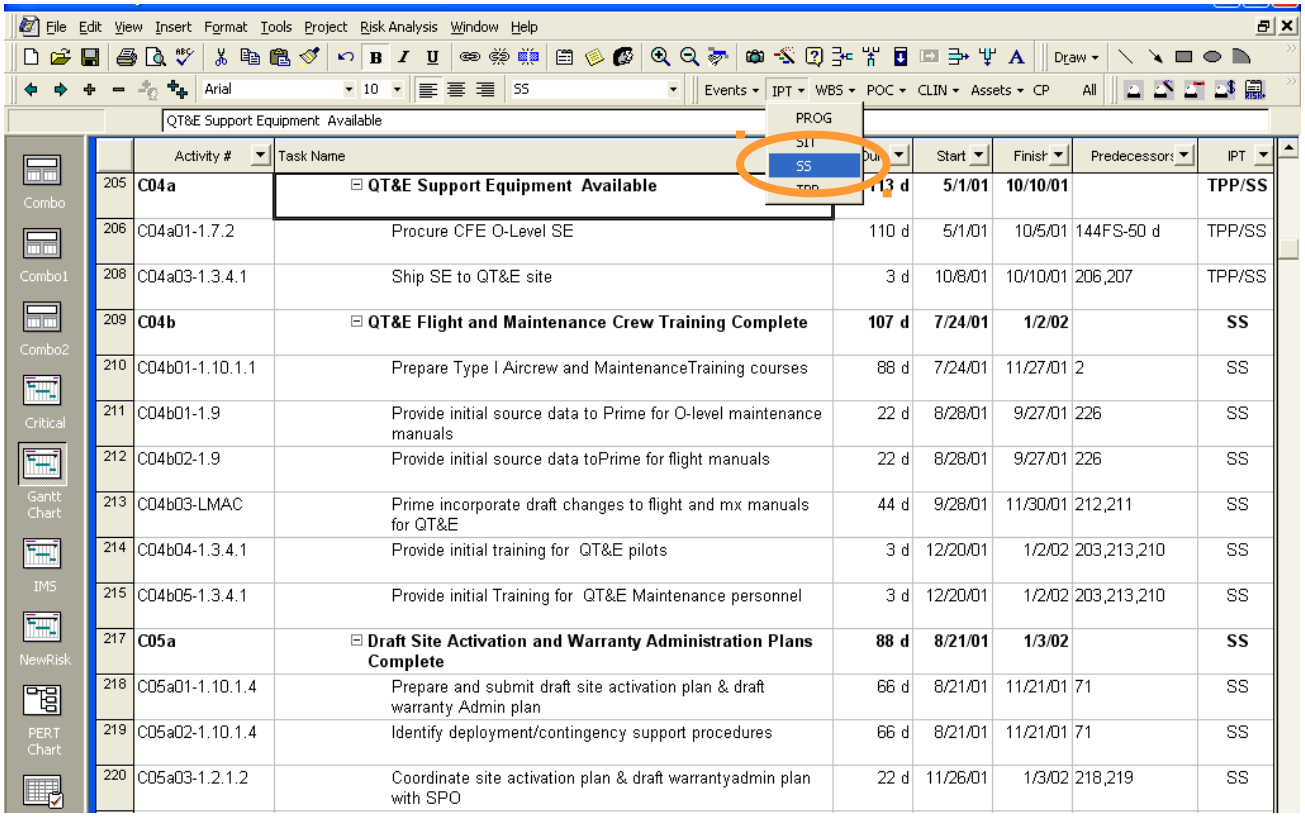
Task PERT View--Example



	Task Name	Dur	Start	Finish	Predecessors
15					
16	**Post Award Conference (PAC)**	**32 d**	**9/17/01**	**10/30/01**	
17	**Integrated Product Teams (IPTs) Staffed and Chartered**	**15 d**	**10/2/01**	**10/22/01**	
18	**IPT Contractor/Govt Members Identified**	**15 d**	**10/2/01**	**10/22/01**	
19	Complete staffing of Contractor IPTs	15 d	10/2/01	10/22/01	2
20	Identify SPO IPT members	10 d	10/2/01	10/15/01	2
21	Identify other Govt agency IPT members	10 d	10/2/01	10/15/01	2
22	**IPT Charters Approved**	**15 d**	**10/2/01**	**10/22/01**	
23	Prepare Team Charters,goals	10 d	10/2/01	10/15/01	2
24	Coordinate and approve Team Charters	5 d	10/16/01	10/22/01	23
25	**Initial Subcontractor/Associate Contractor Start-Up Complete**	**30 d**	**9/17/01**	**10/26/01**	
26	**Initial Subcontracts awarded**	**21 d**	**9/17/01**	**10/15/01**	
27	Turn on _____ subcontract	10 d	10/2/01	10/15/01	2
28	Turn on _____ subcontract	5 d	10/2/01	10/8/01	2

Execution IMS Development Sorting the IMS

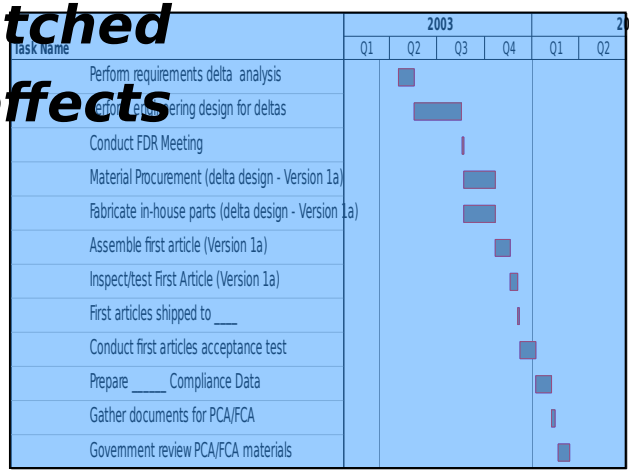
- **IMS can be "sliced" many ways through use of filters and/or menus and the additional data fields**
- **More example in guide**



	Activity #	Task Name	Dur	Start	Finish	Predecessors	IPT
205	**C04a**	**QT&E Support Equipment Available**	**13 d**	**5/1/01**	**10/10/01**		**TPP/SS**
206	C04a01-1.7.2	Procure CFE O-Level SE	110 d	5/1/01	10/5/01	144FS-50 d	TPP/SS
208	C04a03-1.3.4.1	Ship SE to QT&E site	3 d	10/8/01	10/10/01	206,207	TPP/SS
209	**C04b**	**QT&E Flight and Maintenance Crew Training Complete**	**107 d**	**7/24/01**	**1/2/02**		**SS**
210	C04b01-1.10.1.1	Prepare Type I Aircrew and MaintenanceTraining courses	88 d	7/24/01	11/27/01	2	SS
211	C04b01-1.9	Provide initial source data to Prime for O-level maintenance manuals	22 d	8/28/01	9/27/01	226	SS
212	C04b02-1.9	Provide initial source data toPrime for flight manuals	22 d	8/28/01	9/27/01	226	SS
213	C04b03-LMAC	Prime incorporate draft changes to flight and mx manuals for QT&E	44 d	9/28/01	11/30/01	212,211	SS
214	C04b04-1.3.4.1	Provide initial training for QT&E pilots	3 d	12/20/01	1/2/02	203,213,210	SS
215	C04b05-1.3.4.1	Provide initial Training for QT&E Maintenance personnel	3 d	12/20/01	1/2/02	203,213,210	SS
217	**C05a**	**Draft Site Activation and Warranty Administration Plans Complete**	**88 d**	**8/21/01**	**1/3/02**		**SS**
218	C05a01-1.10.1.4	Prepare and submit draft site activation plan & draft warranty Admin plan	66 d	8/21/01	11/21/01	71	SS
219	C05a02-1.10.1.4	Identify deployment/contingency support procedures	66 d	8/21/01	11/21/01	71	SS
220	C05a03-1.2.1.2	Coordinate site activation plan & draft warrantyadmin plan with SPO	22 d	11/26/01	1/3/02	218,219	SS

Execution IMS Development Schedule Risk Analysis

- **IMS supports:**
  - **Schedule Risk Analysis**
    - **Performed by contractor and program/project office**
    - **Includes Critical Path Analysis (CPA)**
      - ✓ ***Identifies tasks to be watched***
      - ✓ ***Early awareness of the effects of schedule slip***



Execution IMS Development Schedule Risk Analysis

Three types

- **Narrative schedule risk analysis**
  - **Explanation of critical path & overall schedule risk**
  - **Normally performed by offeror**

- **Technical schedule risk analysis**
  - **Qualitative evaluation**
  - **Normally performed by source selection functional experts**

- **Statistical Schedule Risk Assessment (SRA)**
  - **“Monte Carlo” type simulation**

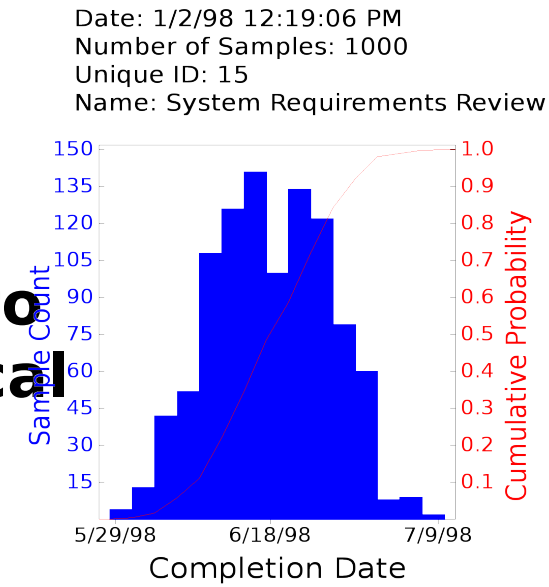
Execution IMS Development Critical Path Analysis (CPA)

- **IMP/IMS POC performs CPA**
  - **Generates critical path**
  - **Reviews with program manager and IPT leads**

  - **Works with IPTs to resolve problems**
  - **Prepares write-up for IMS document**
    - **Demonstrate recognition/understanding of CP**
    - **Identify risk mitigation activities**

Execution IMS Development Statistical Schedule Risk Assessment (SRA)

- **Reasons to perform an SRA**
  - **Gain confidence in schedule executability**
  - **Provide insight into tasks just off critical path - likely to become critical**
- **Number of iterations required**



Completion Std Deviation: 5.2d
95% Confidence Interval: 0.3d
Each bar represents 2d.
SRR

Completion Probability Table

Prob	Date	Prob	Date
0.05	6/5/98	0.55	6/19/98
0.10	6/9/98	0.60	6/22/98
0.15	6/10/98	0.65	6/22/98
0.20	6/11/98	0.70	6/23/98
0.25	6/12/98	0.75	6/24/98
0.30	6/15/98	0.80	6/25/98
0.35	6/16/98	0.85	6/26/98
0.40	6/16/98	0.90	6/29/98
0.45	6/17/98	0.95	6/30/98
0.50	6/18/98	1.00	7/9/98

Execution IMS Development Resource Loading

- **Guide does not recommend resource loading of IMS for proposal submittals**
- **May be appropriate after contract award, depending on program**

Consideration: In competitive procurements, the offerors will probably be making adjustment in resources and pricing right up until proposal submittal. It is very difficult to keep the resource loading in the IMS updated at this point. In fact, this loading will most likely be adjusted after contract award, making the pre-award value doubtful.

Execution IMS Development Iteration

- **Iterate with IMP/IMS Point of Contact (POC)**
  - **Changes to, additions to, or deletion of criteria, accomplishments and events**
  - **Additional tasks, relationships or constraints**
  - **Resolve conflicts**

IMS (and IMP) is a work in progress

IMP/IMS for Evolutionary Acquisition

- **Philosophy unchanged for spiral or incremental development**

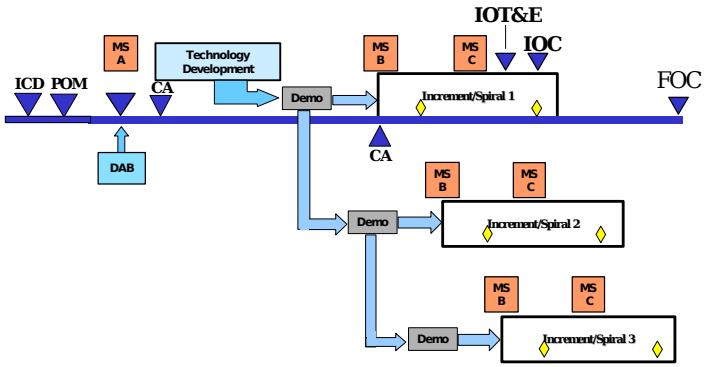
- **Government Roadmap IMP/IMS**
  - **Capture as much as possible of the spiral or incremental development plan**
- **Execution IMP/IMS**
  - **Treat those portions of that can be fairly well defined (e.g., priced options)**

IMP/IMS Implementation and Execution

- ***Pre-Contract Award***
- ***Post-Contract Award***

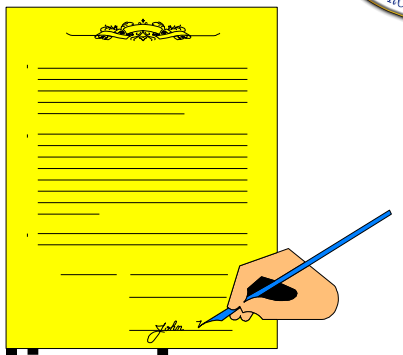
Pre- Contract Award

- **Roadmap IMP/IMS developed/implemented by program/project office team as early as possible**



- **Sole source or Govt-executed program may implement Execution IMP/IMS upon completion**
- **Pre-Award IMP/IMS for competition**
- **Program-unique requirements placed in RFP**
- **Execution IMP/IMS submitted w/proposal**
  - **Implemented at contract award**

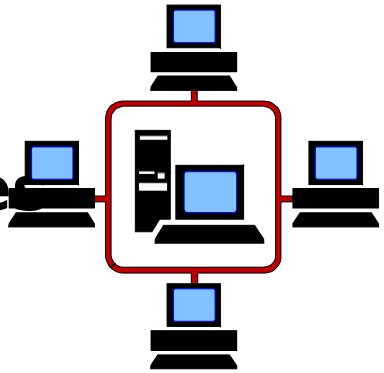
Post-Contract Award



- Selected contractor's IMP becomes part of contract
- The submitted IMS will be baselined
  - Basis for updates
  - Submitted as CDRL or through the Data Accession List
  - Changes to IMP or IMS during program execution discussed under "Change Control Process"

Communication

- **Execution IMP/IMS important to providing baseline for communication of program status**
- **IMS may be made available through electronic data interchange**
  - **Should be set up so that only contractor can make direct change to the IMS**

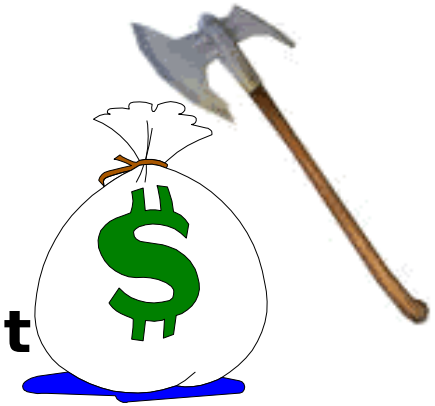


Consideration: Contractors may be reluctant to provide day-to-day access to the program/project office team if they believe it will result in micromanagement through the IMS. It is the responsibility of the program/project office team to avoid “killing them with oversight.”

Program Tracking

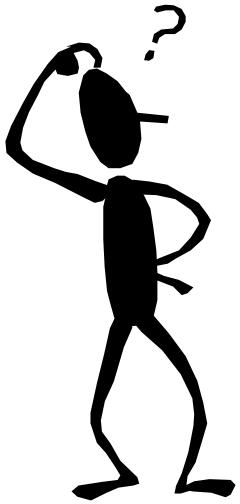
- IMS updates
  - Documented as they occur
  - Regular “block change” of the IMS
- Risk mitigation status
- Slips to the schedule
  - Impact to critical path assessed
  - Work-around plans developed
- At team level, activities can be tracked and monitored at working group meetings
  - e.g., IPT meetings, ILSMT, TPWG

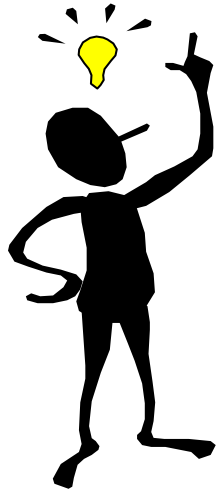
Program Analysis



- Directed budget cuts
  - Critical path analysis to identify items for potential cut with least program impact
  - IPTs assess impacts
    - Teams better able to execute changes they helped analyze and define
  - Update Execution IMP/IMS to reflect revised planning
    - Must be communicated to all program participants
    - EVMS baselines adjusted to reflect new baseline

Program Analysis

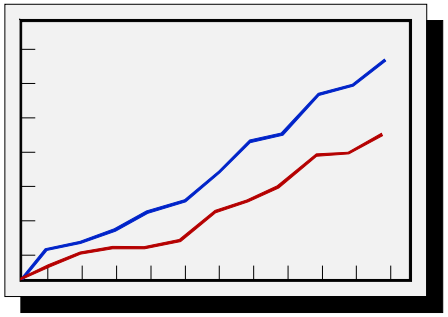




- "What If" exercises
  - Well-defined IMS can be responsive to “what if” exercises at varying levels
  - Statistical risk analysis tools can be used to support these “what if” exercises
    - Described in Section 4.1.5.6 of guide

Reporting

- Internal
  - Detailed IMP/IMS reporting at team level
  - Internal program reviews of execution status
- External
  - IMP/IMS can provide insight beyond traditional reporting
    - Cost Performance Reports
    - Summary schedule charts

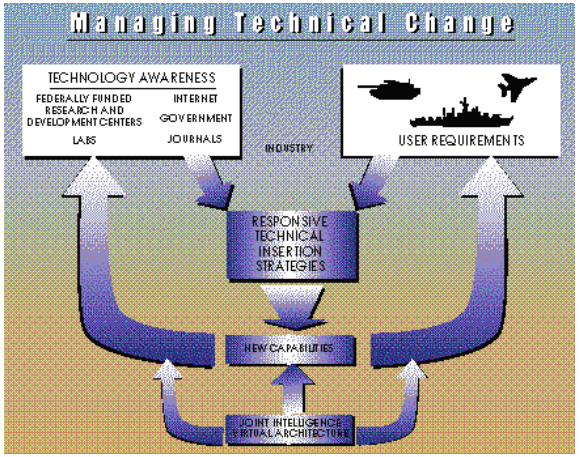


Other Uses

- **Contractor Performance Assessment Reports (CPAR)**
  - **Provide justification and substantiation**
- **Award Fee**
  - **Can be directly tied to successful completion of IMP/IMS activities**

- **Earned Value Management System (EVMS)**
  - **EVMS ideally based on IMS tasks**

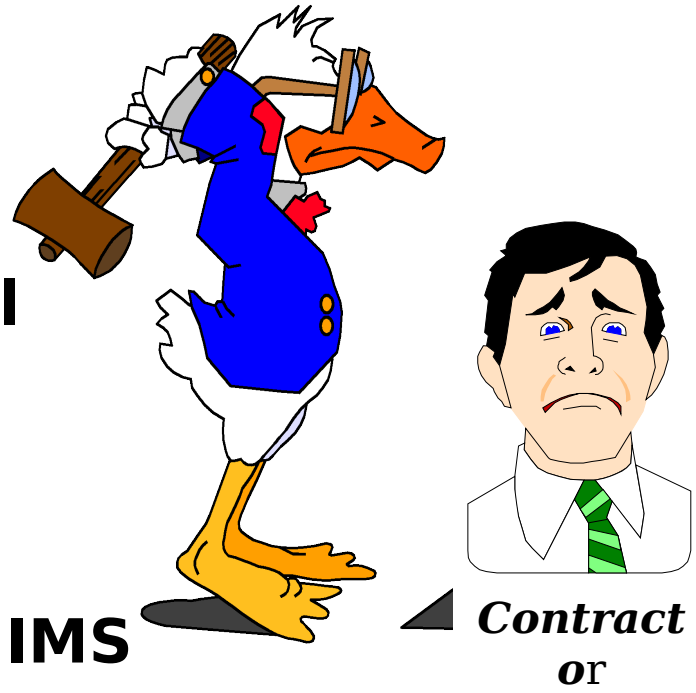
Change Control Process



- IMP
  - Contractual document
  - Configuration Management process governs
- IMS
  - Less rigorous, but equally important
  - Should cover:
    - Documented coordination/approval of IMS changes
    - Identifying IPT responsible for configuration control
    - How revisions are published and distributed

Points to Remember
Why IMS Isn't Used

- **Program/project office caused**
  - **Too much detailed direction in RFP**
  - **Page/line limits**
  - **"Abusing" additional insight into program**



- **Contractor caused**
  - **No IPT ownership of IMS**
  - **Latency - IMS not kept up-to-date**
  - **Not "how we've been doing it for years"**

Course Outline

- Learning Objectives
- IMP/IMS General Description
- IMP/IMS Development and Implementation
- **Getting Help**

Getting Help

- **AFMC Guide is not sole source of help**
- **Acquisition Centers of Excellence**
  - **Help for government roadmap, pre-award and program execution**
  - **Located at HQ AFMC and all product, logistics, and test centers**
  - **Listed in guide**

- **References and hyperlinks in guide**

Getting Help
ACE Contact Points

ACE Office	Base	DSN	Commercial
HQAFMC/AE	Wright Patterson AFB	986-0850	937-656-0850
AAC/AE	Eglin AFB	872-7148	850-882-7180
AEDC/AE	Arnold AFS	340-4720	931-454-4720
AFFTC/AE	Edwards AFB	527-5686	661-277-5686
AFRL/AE	Wright Patterson AFB	986-9218	937-656-9218
ASC/AE	Wright Patterson AFB	785-5315	937-255-5315
ESC/AE	Hanscom AFS	478-7176	781-377-7176
MSG/AE	Wright Patterson AFB	986-2058	937-656-2058
HSW/AE	Brooks AFB	240-8476	210-536-8479
OC-ALC/AE	Tinker AFB	884-2791	405-734-2791
OO-ALC/AE	Hill AFB	777-7999	801-777-7999
SMC	Los Angeles AFS	833-2401	310-363-2401
WR-ALC/AE	Robbins AFB	468-9303	478-926-9303

Getting Help
Appendices To AFMC Guide

- Appendix A - Sample SOW statements
  - If Govt provides SOW
- Appendix B - Sample Section L words
- Appendix C - Sample Section M words
- Appendix D - Reference Documents
  - Includes hyperlinks
- Appendix E - Sample IMP and IMS
  - Relatively small and simple program
  - Illustrates hierarchical nature of IMP/IMS

IMP/IMS Summary

- **IMP/IMS are valuable management tools**

- ✓ **Systematic approach to program planning, scheduling, and execution**
- ✓ **Applies to competitive and sole source acquisitions as well as government-only in-house efforts**
- ✓ **Tool for improved day-to-day program execution**
- ✓ **Improves program/project insight**
- ✓ **Supports budgeting, “what-ifs”, and work-arounds**

Solid IMP/IMS → Low-Risk Selection → Executable Program